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CATALOGUE OF

PRINTING PRESSES

AND

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LITHOGRAPHIC PRESSES,
STEREOTYPING AND ELECTROTYPING MACHINERY,
BINDERS' PRESSES AND MATERIALS.

NEW-YORK:
504 GRAND STREET.
1881.

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CATALOGUE OF

PRINTING PRESSES

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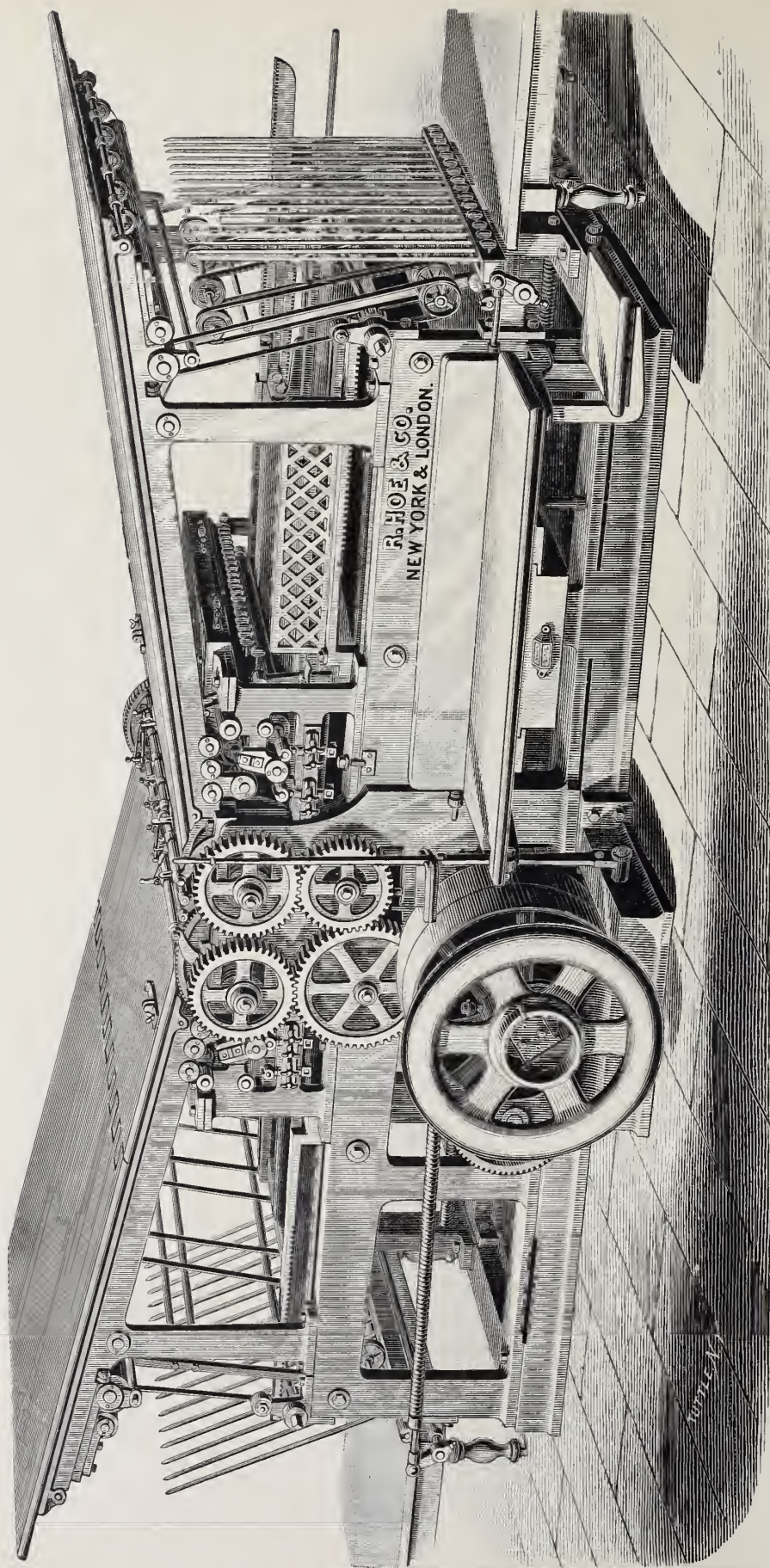
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7156



PATENT DOUBLE-CYLINDER PRESS.

PATENT DOUBLE-CYLINDER PRESS.

This press is exceedingly strong, and the number seven size is capable of a speed of three thousand per hour; the smaller sizes, of course, running faster in proportion than the larger. As will be seen by the cut, it has been entirely remodeled, and the height reduced, so that its solidity, durability, and general efficiency are greatly increased.

The side frames are very solid, and rest upon a heavy foundation frame.

The bed is driven by an improved motion, and starts and stops without noise or jar.

The springs, by our new patent construction, are absolutely noiseless, and are so arranged as to permit the turning of the press backward or forward freely by hand, without compressing the spring.

The machines are furnished with our *patent improved air springs* when desired.

The friction-roller frames under the bed are driven by a patented mechanism, instead of being allowed to run free. This decreases the wear on the steel ways, and prevents the rollers from cutting.

The bed friction rollers are made of the best tool steel.

The gearing is all made of special iron, and cut with the greatest accuracy. The racks are cut on a machine constructed by ourselves expressly for the purpose.

The long universal-joint shaft, assisted by a counterbalance weight, gives a regular motion to the bevel pinion driving the bed.

The fountain is so constructed that the ink lies upon the knife and passes under the roller. The fountain itself, and all the rollers, are in a sliding carriage, which may be drawn back by a rack and pinion.

The roller stocks are of wrought-iron pipe, with steel journals welded in.

The patent adjustable roller sockets have wrought-iron bearings, case-hardened.

The finger motion is noiseless.

The fly cam has a continuous surface, so that the fly rises and falls noiselessly without striking the table, and does not require fastening up when the press is turned backward.

The vertical fly-tape frames can be removed without loosening a screw, so that the forms are accessible from either end of the press.

The fly can be removed in a minute.

The platforms for feeders are adjustable, and are provided with drawers for tools.

The pulley shafts, and, in fact, all the shafts throughout the press, have their bearings in independent boxes, and not in the side frames. Thus, when the bearings become worn, they can be replaced at slight expense.

Sizes and Prices.

No.	Bed.	Matter.	Price.	No.	Bed.	Matter.	Price.
6	32 × 47 in.	27 × 42 in.	\$5,500	8	38 × 55 in.	33 × 50 in.	\$6,750
7	35 × 51 in.	30 × 46 in.	6,000	9	41 × 60 in.	36 × 55 in.	7,500

The prices include apparatus for steam power; also, felt blanket, roller moulds, and two sets of stocks.

Improved sheet cutter, extra, \$50 per cylinder.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
6	16 ft.	8 ft. 10 in.	5 ft.	About 8 tons.	2340 to 3600	2½
7	17 ft.	9 ft. 3 in.	5 ft. 3 in.	About 9 tons.	2040 to 3300	3
8	18 ft. 4 in.	9 ft. 7 in.	5 ft. 7 in.	About 10½ tons.	1830 to 3000	3½
9	19 ft. 10 in.	10 ft. 6 in.	6 ft.	About 12 tons.	1750 to 2800	4

SUGGESTIONS TO PRESSMEN.

1. ABOUT THE FOUNDATION. It is very important to have a good solid foundation. Level the bed plate carefully, putting four packings under each side, and let them be slightly tighter at the ends than in the centre.

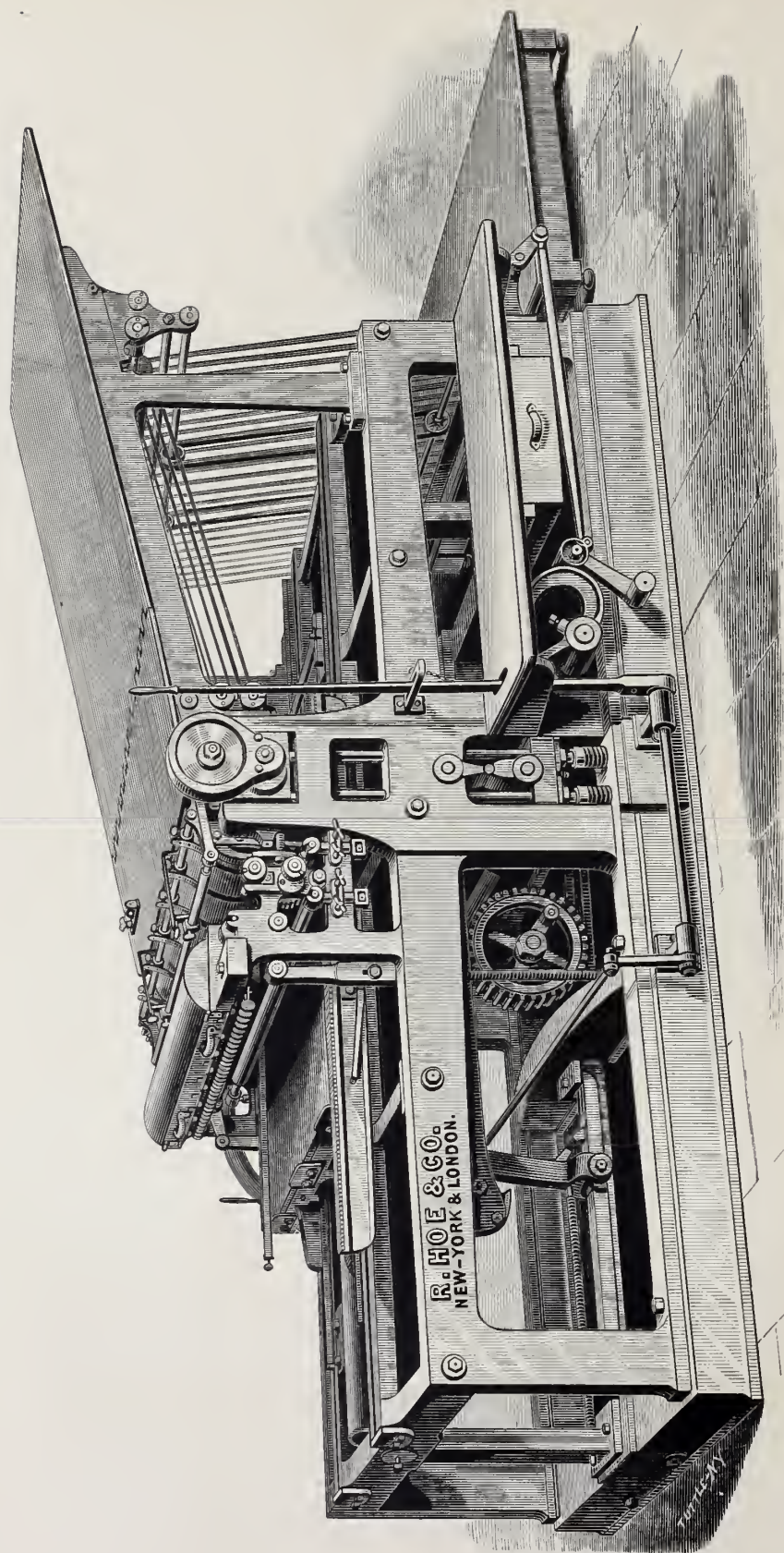
If the machine stands on a floor, try it again when all together, for fear that it may have settled out of level, and re-adjust, if necessary. Test the level of the press twice a year.

2. CLEANING. Clean thoroughly all the joints and fitting parts, and screw them together firmly, but without too much force. Clean and oil carefully all the working parts before putting them together. See that all the oil holes are open, and fill them with oil.

Try each moving piece, when put in place, to see that it runs freely, but without play.

Continued on page 4.





PATENT SINGLE CYLINDER PRESS.

PATENT SINGLE SMALL CYLINDER PRESS.

This machine has, within a few years, been entirely remodeled and reduced in height, as will be seen by the cut of the press, so as to increase its speed, solidity, durability, and general efficiency.

The side frames are very solid, and rest upon a heavy foundation frame.

The bed is driven by an improved motion, and starts and stops without noise or jar.

The springs, by our new patent construction, are absolutely noiseless, and are so arranged as to permit the turning of the press backward or forward freely by hand, without compressing the spring.

The machines are furnished with our *patent improved air springs*, when desired.

The friction-roller frames under the bed are driven by a patented mechanism, instead of being allowed to run free. This decreases the wear on the steel ways, and prevents the rollers from cutting.

The bed friction rollers are of the best tool steel.

The gearing is all made of special iron, and cut with the greatest accuracy.

The racks are cut on a machine constructed by ourselves expressly for the purpose.

The long universal-joint shaft, assisted by a counterbalance weight, gives a regular motion to the bevel pinion driving the bed.

The fountain is so constructed that the ink lies upon the knife and passes under the roller.

The roller stocks are of wrought-iron pipe, with steel journals welded on.

The patent adjustable roller sockets have wrought-iron bearings, case-hardened.

The finger motion is noiseless.

The fly cam has a continuous surface, so that the fly rises and falls noiselessly without striking the table, and does not require fastening up when the press is turned backward.

The fly can be removed in a minute.

The platform for the feeder is adjustable, and provided with drawer for tools.

Single Small Cylinder Presses, continued. Sizes and Prices.

No.	Bed.	Matter.	Price.	No.	Bed.	Matter.	Price.
6	32×47 in.	27×42 in.	\$3,250	8	38×55 in.	33×50 in.	\$4,000
7	35×51 in.	30×46 in.	3,600	9	41×58 in.	36×53 in.	4,500

The prices include apparatus for steam power; also, felt blanket, two roller moulds, and two sets of stocks.

Improved sheet cutters, \$50. Patent reversing motion extra.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
6	12 ft.	8 ft. 9 in.	4 ft. 10 in.	About 6 tons.	1350 to 2400	2
7	12 ft. 6 in.	9 ft. 4 in.	5 ft.	About 7 tons.	1400 to 2200	2½
8	13 ft. 7 in.	10 ft. 6 in.	5 ft. 5 in.	About 7½ tons.	1340 to 2000	3

SUGGESTIONS TO PRESSMEN.

Continued from page 2.

3. TESTING. Turn the press by hand occasionally, while putting it together, and give it a few more turns when it is finished. Then put on the belt, and let it run half a day before putting on a form, observing, in the meanwhile, that the oil runs freely from the bearings, and the working parts keep perfectly cool.

4. TO ADJUST CYLINDER. Make up the cylinder to the exact height of its bearers and put on a large form of type. Adjust the screws to give a proper impression and raise the bearers on the bed up against the cylinder; then make all fast, and do not again alter the impression except by overlays or underlays.

5. FOUNTAIN. Adjust the ink fountain evenly from end to end first, then cut off the ink carefully where required.

6. CHANGING CYLINDER. To change the cylinder backward or forward with the bed to suit forms, draw the intermediate wheel out of gear with the cylinder wheel. In again starting, be very careful that the register rack is properly adjusted, for a little inattention here may cause trouble and expense.

7. REVERSING MOTION. Oil must be carefully excluded from the friction grooves in the fly wheel, and if any oil gets in, it should be cleaned out. No foreign substance should be put in to make the brake operate more promptly.

8. OILING. When the press is new, each bearing should be oiled once every half hour during the first few days, gradually extending the time to twice a day. Open and examine every bearing once a month. The finest quality of sperm oil is the best known lubricator, and should be frequently, but sparingly, used.

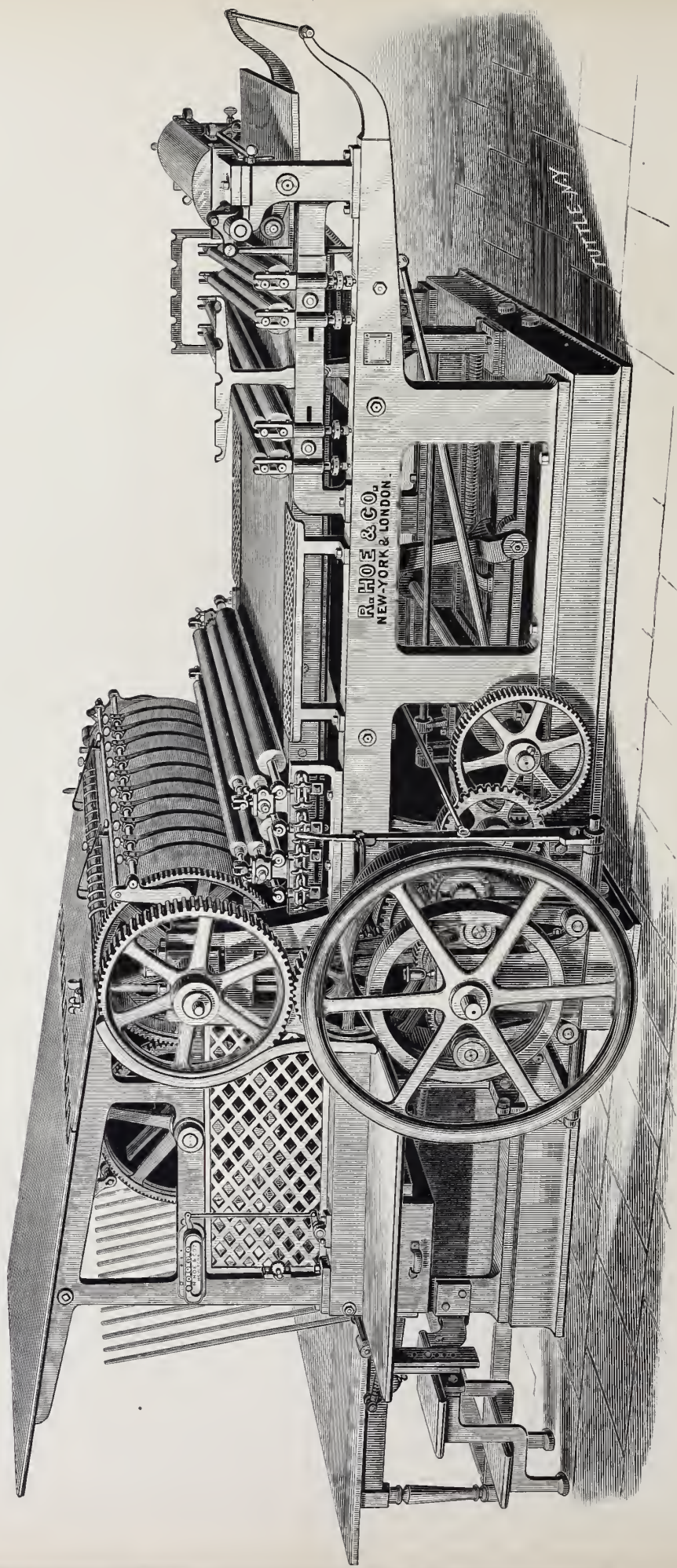
Devote a little time each day to keeping the press clean.

As it is very difficult to procure pure sperm oil, we have arranged to keep a stock on hand for the accommodation of our customers. It will be furnished by the barrel or gallon at the lowest market prices.

9. CAUTION. Single small cylinder and double-cylinder newspaper presses should not be turned backward over the centre, as the grippers, remaining partly open, may damage the form and injure the press.

Continued on page 8.





PATENT TWO-REVOLUTION PRESS.

TWO-REVOLUTION PRESS, WITH FOUR ROLLERS.

(PATENT CYLINDER DELIVERY.)

This machine, now a great favorite with the trade, is intended especially for illustrated newspapers, periodicals, and rapid book work, which it will perform at a high speed, with accurate register and excellent distribution.

It takes its name from the fact that the cylinder makes two revolutions to each run of the bed, rising to allow the bed to run back, as in the double and single small cylinder presses.

The frame is very solid, and the gearing all made of special iron.

The mechanism for driving the bed is similar to that on our large cylinder presses, comprising the long universal-joint shaft and geared friction-roller frames. Its motion is smooth and noiseless.

The fountain, the fly cam, and the patent fly are the same as used on all our improved presses.

The distributing rollers run in a hinged frame, which is quickly raised to allow the form rollers to be removed and replaced without deranging their adjustment. The iron ink table and the table distributing rollers are the same as in our stop-cylinder and four-roller large cylinder presses. It has, however, no large distributing cylinder unless especially ordered.

There are four ways, instead of two, for the bed. This machine has our new patent air springs, and the press can be turned by hand without compressing them. The patent reversing motion enables the feeder to stop the press and run it backward without leaving his stand.

The patent delivering cylinder takes the printed sheets from the main cylinder without the aid of cords or tapes, as in the stop-cylinder press, and sends them, by a set of independent and adjustable cords, down in front of the fly.

Sizes and Prices.

No.	Bed inside bearers.	Rollers covering Entire			Price.	No.	Bed inside bearers.	Rollers covering Entire			Price.
		Matter.	Form.					Matter.	Form.		
6	32×47 in.	27×42 in.	4		\$4,250	8	38×55 in.	33×50 in.	4		\$5,300
7	35×51 in.	30×46 in.	4		4,750	9	41×60 in.	36×55 in.	4		6,250

The prices include apparatus for steam power, two sets of stocks, and boxing and shipping, or delivery, set up, in New-York.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
6	14 ft. 8 in.	8 ft. 11 in.	5 ft. 4 in.	About 8 tons.	1150 to 1800	3
7	15 ft.	9 ft. 1 in.	5 ft. 6 in.	About 8½ tons.	1080 to 1700	3
8	16 ft. 2 in.	9 ft. 8 in.	5 ft. 11 in.	About 10 tons.	1020 to 1560	3½
9	17 ft. 10 in.	10 ft. 2 in.	6 ft. 2 in.	About 11½ tons.	950 to 1500	4

HINTS ON MAKING-READY FOR CYLINDER PRESSES.

1. The nature of the making-ready should be governed by the paper provided for the work. Soft news paper readily takes impression; hard writing paper resists it. When little time can be allowed for making-ready, the paper should be wet down and made pliable the day before the form goes to press; and the quires of damp paper should be turned and put under heavy weights, or in standing press, so as to make the sheets equally damp in every part. Avoid over-damping. Job and wood-cut work are most acceptably done on dry paper, but usually at greater loss of time in making-ready.

2. See that the bearers of the bed are properly adjusted, a trifle more than type height, and that both impression screws have proper bearings on the journals, so as to allow the cylinder to fairly, but not too firmly, press upon the bearers.

3. The packing, or the impression surface of the cylinder, should next receive attention. Every press is provided with an India-rubber blanket, which makes the most serviceable packing for general work. It is smooth, firm, elastic, and will last a long time, if carefully treated. Do not allow oil or grease to get on it. Do not paste overlays on it.

4. For rude presswork, like posters, old plates, or newspapers set in worn type, the India-rubber blanket is, by some printers, thought not sufficiently elastic. They prefer a woollen blanket, because it helps them to make-ready quicker. But what may be gained in speed by use of blanket is lost in increased wear of type and in inferiority of impression. The more elastic the surface, the duller or coarser the print.

5. Fine presswork is most surely had by the aid of an inelastic press-board packing. This press-board is the hard and strong board which is usually provided for the dry-pressing of printed sheets in standing presses. Press-board packing can be used to advantage only on forms of types, or on plates made from types, that are as good as new. As it compels the pressman to slow and careful making-ready, it cannot be used to advantage on general job work, or on small editions. When a form of new type has been properly made-ready for this packing, it will show a sharper impression

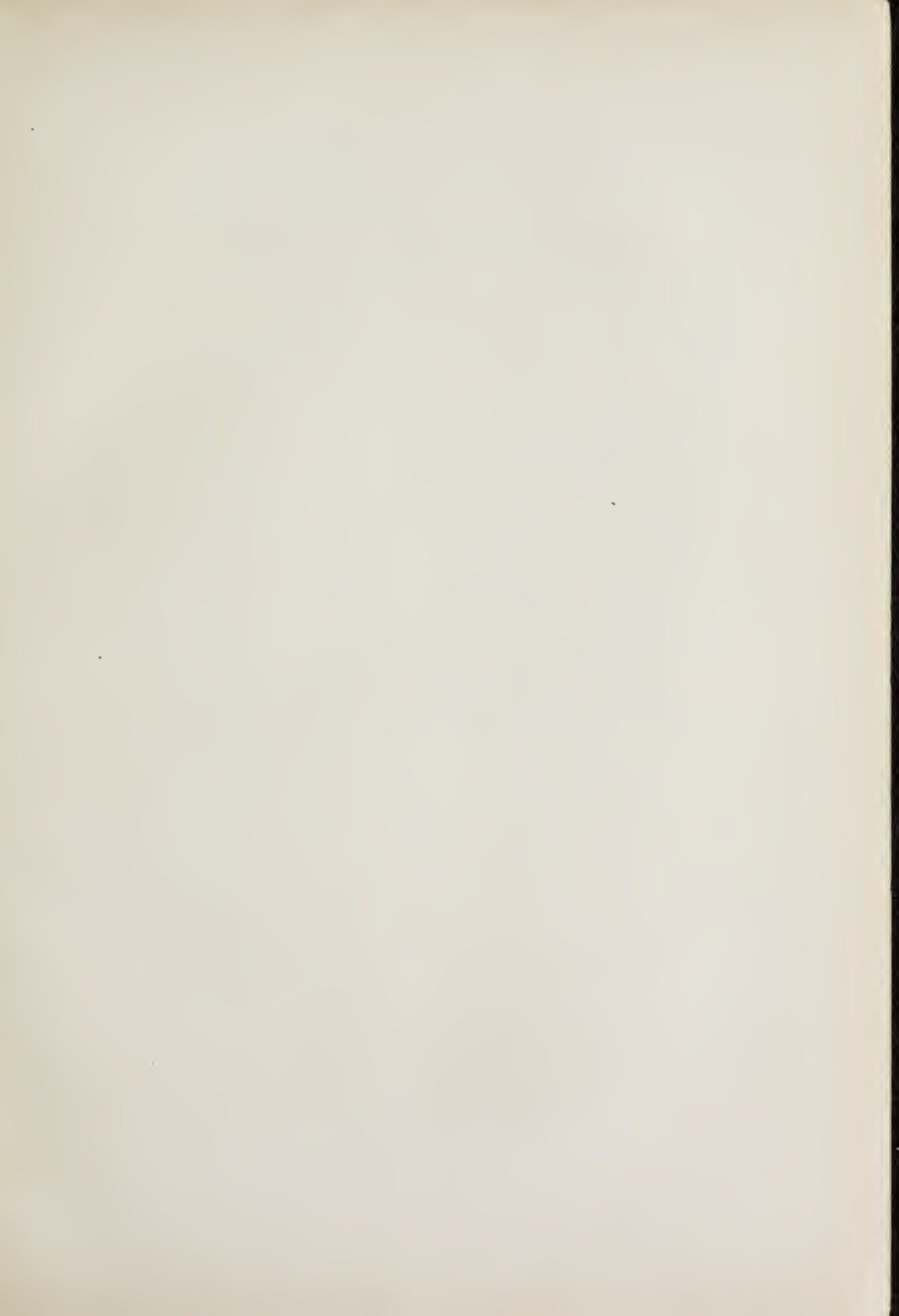
than can be made by any elastic packing. Properly used, it is not wearing to type.

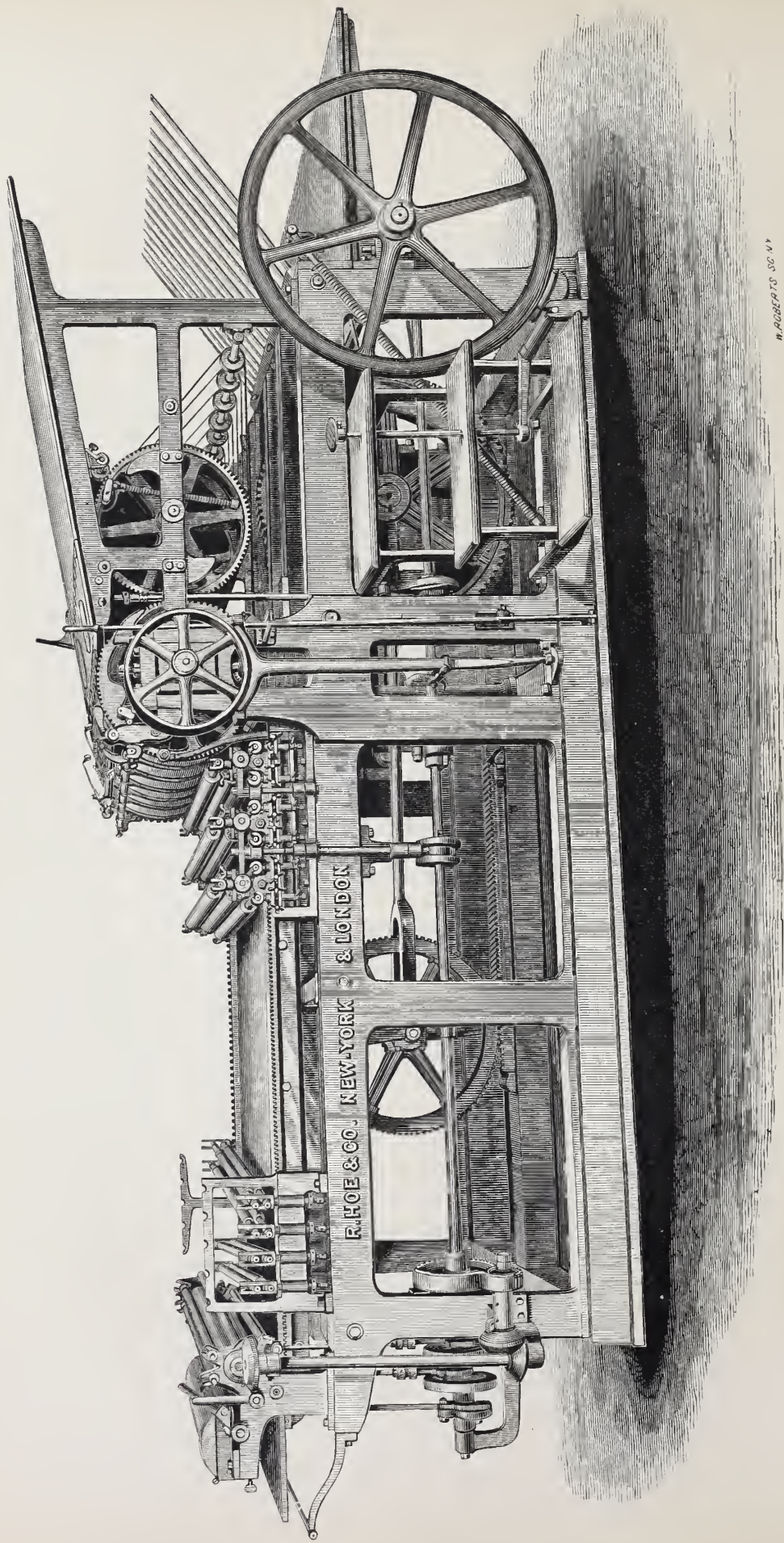
6. The different kinds of packing may be combined for special kinds of work. Flannel or billiard-table cloth may be put over a thin press-board packing; two or more sheets of paper may be put over a rubber blanket.

7. The packing selected should be tightly stretched over the cylinder, without bag or wrinkle. Labor in making-ready is thrown away if the packing be not kept tight. One end of the rubber or woollen blanket may be fastened on the hooks that project inward in the opening at the gripper edge of the cylinder. The other end may be tightly laced with saddler's thread, at the other opening. A better way is to sew a strip of canvas on that end of the blanket, and to wind it around the reel in this opening.

8. To put on a press-board packing, select a board the full width of the cylinder between the bearers, and about ten inches longer than the impression surface. If the board be too wide between bearers, cut down to exact length. Cut with sharp knife, straight and smooth, leaving no rough or turned edge. Carefully crease the part of the board that will be under the grippers, about one half-inch from the edge. Lay this creased part on the flat edge of the cylinder at its opening, cover it with a thin cherry reglet, and bring down the clamps provided for the purpose quick and hard, so as to hold the board securely against any pulling from the other end. Proceed in a similar manner at the other end, stretching it so tightly that it hugs the cylinder at every point. Some pressmen carefully dampen the packing after it has been put on, by repeated spongings, until the board swells and bags. When it has swelled sufficiently, they re-stretch the board and fasten it down. As the board slowly dries, it contracts and hugs the cylinder with great tightness. To restore the surface, made somewhat rough by dampening and stretching, it must be covered, when dry enough, with shellac varnish. This is tedious work, usually taking two, sometimes three days; but it is worth the trouble, for a packing neatly put on will last, with care, for years. One or more

Continued on page 12.





W. ROBERTS SC. N.Y.

PATENT STOP-CYLINDER PRESS.

PATENT STOP-CYLINDER PRESS.

This press is designed for the finest quality of wood-cut and color work, and will print with a delicacy of impression and accuracy of register unequalled by any other machine. It is of great strength throughout, and the principal cams have been enlarged, and the working parts are of steel and hardened.

The gearing is all made of special iron and the cylinder shaft of steel.

The bed is driven by a crank, and stops and starts without noise or jar. It is shod with hard steel, and in all but the smallest sizes runs upon four tracks, which are also of steel as hard as can be worked.

The bed friction rollers are forged out of the best tool steel.

The friction-roller frames are driven by a patented and positive motion, and are guarded so that they cannot get out of place or strike against the ends of the ribs.

The distributing cylinder, of polished steel, with its large composition rollers, receives the ink from the fountain and transfers it to the table.

The ink table is of iron, warranted to remain always true and level.

The distributing rollers can be set parallel or at any angle required. They are of wrought-iron pipe with steel journals welded in.

The form rollers, also of iron pipe with steel journals, are from four to six, according to the size of the machine. They are not driven by gearing or friction rolls, but by the contact of the distributing rollers above them, the surfaces of which run always at the same speed as the type surface.

When so ordered, the press is arranged so that the bed may run either once or twice before the cylinder moves, thus passing the form either two or four times under the inking rollers, as desired, before taking the impression.

The new patent cylinder clamp causes the impression cylinder to stop without jar and stand without tremor, of course preventing the wear of the stop cam. There is also a brake on the fly wheel, by which the press can be quickly stopped.

The impression cylinder is stationary while the sheet is being placed, the fingers closing and the points being withdrawn before it starts.

The cylinder wheel gears directly into the rack on the bed, and is driven by it, so that perfect register is warranted.

The patent delivering cylinder takes the printed sheets from the main cylinder, without the aid of cords or tapes, and sends them, by a set of independent and adjustable cords, down in front of the fly.

The patent fly can be removed in a minute. It has sharp-edged fingers to prevent smear, any one of which can be changed in an instant in position by a thumb-screw.

Sizes and Prices.

No.	Bed inside bearers.	Rollers covering		Price.	No.	Bed inside bearers.	Rollers covering		Price.
		Matter.	Entire Form.				Matter.	Entire Form.	
2	20 × 25 in.	16 × 21 in.	4	\$2,600	6	32 × 47 in.	27 × 42 in.	6	\$4,600
3	24 × 29 in.	19 × 24 in.	4	3,000	7	35 × 51 in.	30 × 46 in.	6	5,300
4	26 × 34 in.	21 × 29 in.	4	3,450	8	38 × 55 in.	33 × 50 in.	7	6,000
5	29 × 42 in.	24 × 37 in.	5	4,000	9	41 × 60 in.	36 × 55 in.	8	6,900

The prices include apparatus for steam power and boxing and shipping, or delivery, set up, in New-York; also, roller moulds and two sets of stocks.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
2	9 ft. 10 in.	4 ft. 10 in.	4 ft.	About 4 tons.	1140 to 1800	1½
3	11 ft. 6 in.	5 ft. 6 in.	4 ft. 6 in.	About 5 tons.	924 to 1650	¾
4	12 ft.	6 ft.	5 ft.	About 6 tons.	852 to 1500	1
5	13 ft. 7 in.	7 ft. 7 in.	5 ft. 4 in.	About 6½ tons.	750 to 1350	1½
6	15 ft.	8 ft.	6 ft.	About 8½ tons.	672 to 1200	1¾
7	16 ft.	9 ft.	6 ft. 4 in.	About 10 tons.	588 to 1050	1¾
8	18 ft.	11 ft.	7 ft.	About 11½ tons.	506 to 900	2
9	18 ft. 4 in.	11 ft. 2 in.	7 ft. 2 in.	About 12½ tons.	421 to 750	2

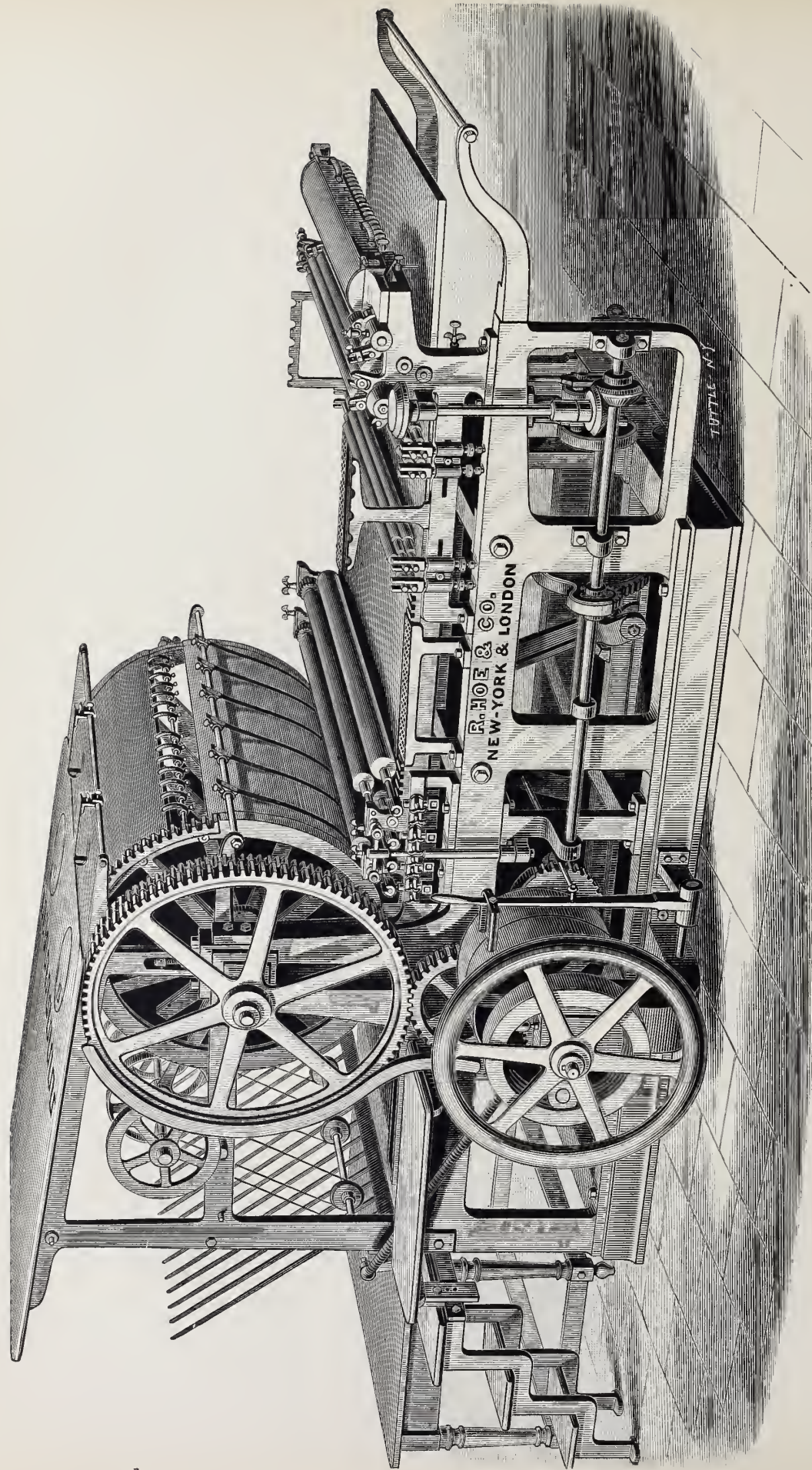
SUGGESTIONS TO PRESSMEN.

Continued from page 4.

10. TO ADJUST GRIPPER MOTION ON IMPRESSION CYLINDER. To prevent the tearing of sheets or dropping of them too soon, care must be taken that the toothed segment on the end of the cylinder rests on its stop pin when the fingers are closed.

11. SPRINGS, whether spiral or air springs, should be regulated according to the weight of the form and speed of the press, for a heavy form or high speed requires more spring than a light form or slow speed.





PATENT FOUR-ROLLER SINGLE LARGE CYLINDER PRESS.

PATENT FOUR ROLLER SINGLE LARGE CYLINDER PRESS.

This machine has been recently entirely remodeled and improved in numerous important particulars. The height is materially reduced, and it is in every way more solid, durable, and efficient. The speed is increased over twenty-five per cent., and the quality of the printing is excellent for all kinds of work.

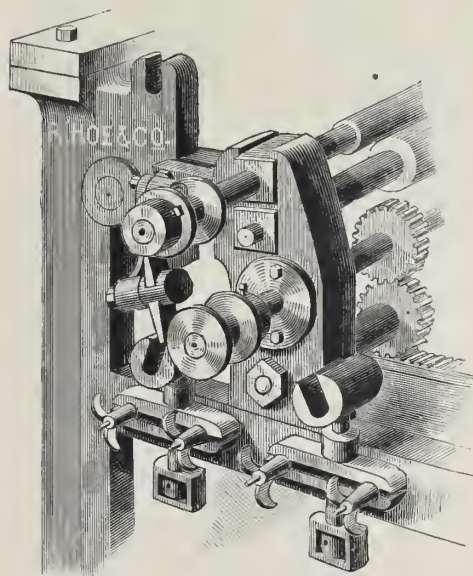
The frame is cast solid, and special iron is used for all the gearing.

The bed is driven by an improved motion, and starts and stops without noise or jar.

The new improved *patent air springs* are a great improvement over any springs of the kind heretofore made.

The friction rollers and frames under the bed are driven by a patented mechanism instead of being allowed to run free. This decreases the wear on the steel ways, and prevents the rollers from cutting.

The long universal-joint shaft, with its heavy counterbalance weight, gives a regular motion to the bevel pinion which drives the bed.



Positive Vibratory Apparatus for
Distributing Rollers.

The fountain is so constructed that the ink lies upon the knife and passes under the roller, a very small quantity being sufficient to operate it. It has a tight cover, and handles by which its entire front, with knife attached, may be quickly drawn back for cleansing.

The distributing cylinder, which is furnished when especially ordered, with its large composition rollers, receives the ink from the fountain and transfers it to the table.

The ink table is of iron, and of course always remains true and level.

The table distributing rollers can be set parallel or at any angle required.

The form rollers are driven by the contact of the distributing rollers above them, the surfaces of which always move at the same speed as the type surface.

There are four steel ways for the bed.

The patent yielding points hold the sheet till the grippers pull it away, leaving no interval in which it is free to slide about.

Hints on Making-Ready for Cylinder Presses . . . Continued from page 6.

sheets of paper may be put over this packing, on which paper overlays may be fastened. The packing itself should never be touched with paste, or moisture of any kind. To secure the overlays, a web of muslin may be stretched over all by means of the reel.

9. For some kinds of wood-cut presswork, the press-board packing may not be hard enough. A packing or jacket of sheet brass is sometimes riveted on the cylinder. In one New-York office the cylinder itself is made so thick that there is no need of packing. The added brass or iron makes the printing surface solid, and best adapted to the giving of sharp impressions.

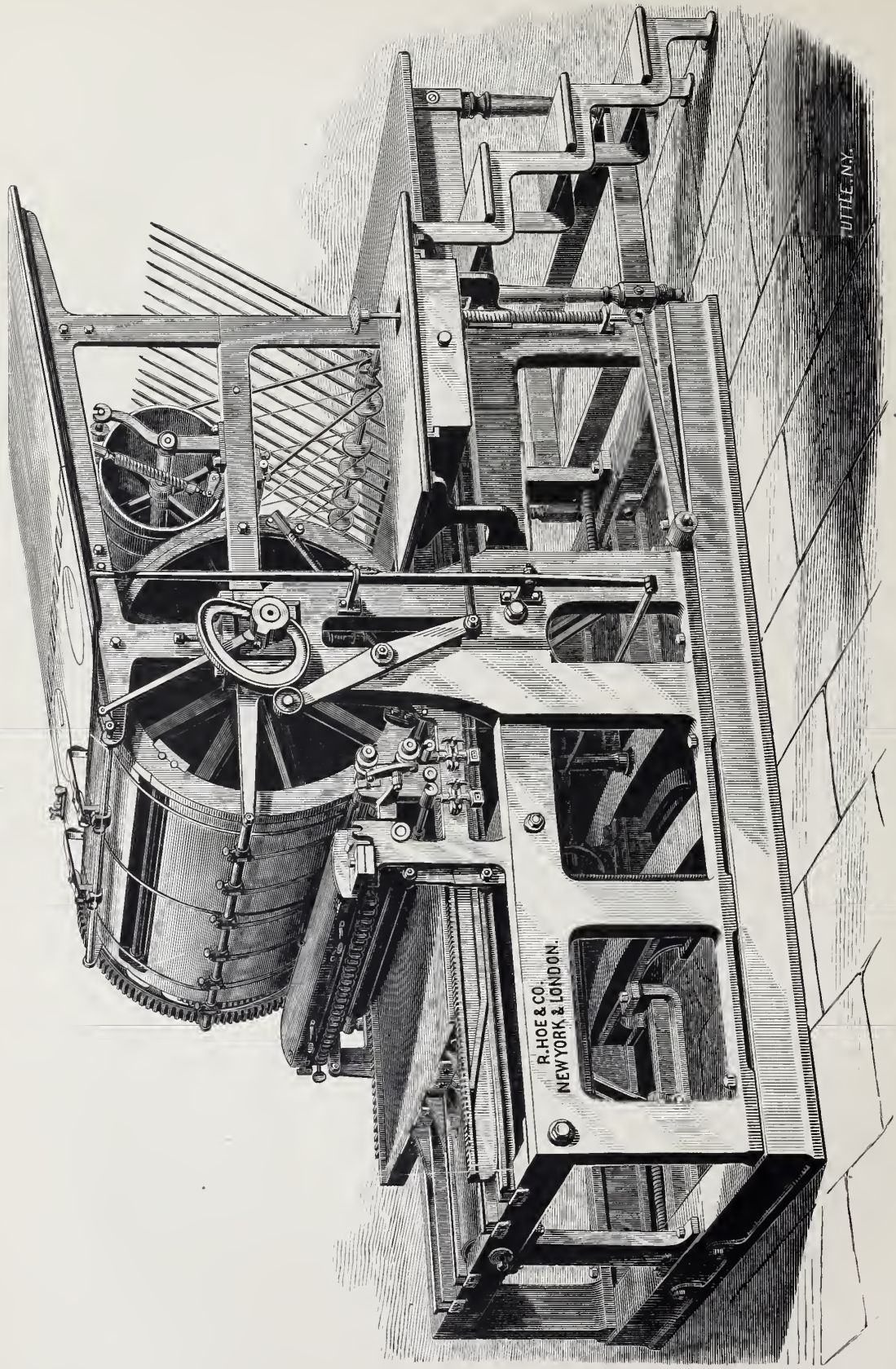
10. Examine the form before anything is done toward making-ready. If it is a type form, see that chase, furniture, rules, and types rest flat on the bed. If any part of the form springs, it is unfit for making-ready. The chase may be warped; the form may be locked too tight; the justification may be bad. Whatever the cause, the fault should be corrected. If not corrected, spaces and furniture will "work up" under impression, presswork will be delayed, and the type will be seriously damaged. If the form is of plates, see that the blocks are not warped, and that they are of even height, and are firmly held in the chase. If plates are fastened on blocks, and the blocks are warped, are out of square, or of uneven height, have these faults corrected before beginning to make-ready. The blocker can correct in shorter time than the pressman. Lock the form up firmly on the bed, so that it cannot move, using furniture that does not spring and gives good bearing. If the form be small, put it as close to the back of the bed as the grippers will allow, and midway between the bearers. The cylinder should have been set so that the grippers will just lap over the edge of the back of the bed. When the grippers are in this position, take exact measurement of the distance between the point of any gripper and the back edge of the bed. Make a gauge from brass rule of the measurement, and use it every time a form is laid on the bed. See that the distance from the type to the edge of the chase tallies with the gauge. This test is needed to prevent the closing of the grippers and the crushing of type on a form that may have been made up too near the edge.

11. Where an unusually wide margin must be given to the printed sheet, and the chase is small, put enough of furniture at the back of the bed to make up the deficiency. If the chase is large, containing a book form, with pages locked up against the inner crossbars, making unusual distance between the outer edge of page and the chase, then unscrew the clamps at the back edge of the bed, and allow the chase to project backward, until the grippers close at the proper point near the type. If the space between the edge of chase and edge of type is very large, then it may be necessary, on a two-roller cylinder, to reset the cylinder. Remove the screw and washer at the end of the cylinder shaft; draw the intermediate pinion out of gear; loosen the screws in the gauge rack. Then turn the cylinder to the point required, seeing that the grippers just escape the type; put the intermediate wheel again in gear, adjust the gauge rack, and screw up tight as before. This resetting of the cylinder can be done only on the two-roller cylinder. Do not attempt to reset it unless resetting is unavoidable. Think of what you are doing; go slow, and be sure that every movement made is right.

12. Protect the packing by pasting over it two sheets of clean book paper. Put in the inking rollers, adjusting them so that they will lightly press the types and each other. Do not set too tightly, for if they chafe they will soon wear out. Turn on the ink, by the screws of the inking fountain, with caution. The ink, at this stage, must just stain the rollers. Then take, on the paper provided for the form, a pale impression, which will show whether the margins are correct. If they are not, lengthen or shorten the drop feed guides until the right margin is made. Push out the iron tongues at the edge of the feed board in positions where they will equally sustain the paper. Slide the drop guides along the rod until they fall squarely over the tongues. Set the side guide so that it will give a proper margin in length to the sheet to be printed. Adjust the grippers so that all will seize the sheet at the same instant. Take a clean proof on its own paper, with the type in proper position on the sheet. If the form is a book form, make sure that it will register

Continued on page 14.





PATENT TWO-ROLLER SINGLE LARGE CYLINDER PRESS.

PATENT TWO-ROLLER SINGLE LARGE CYLINDER PRESS.

The two-roller machines have, like those with four rollers, been entirely remodeled, giving an increase of speed of over twenty-five per cent.

The general description given of our four-roller large cylinder press applies equally to the two-roller presses.

The inking apparatus is placed close to the impression cylinder, and when required is arranged so that the whole may be drawn out upon ways or slides to the end of the press, leaving the cylinder and the bed exposed and easy of access for making overlays and adjusting the forms.

When especially ordered, the table distribution will be put on instead of that with the usual rack and pinion.

Sizes and Prices.

No.	Bed inside bearers.	Rollers covering		Price.	No.	Bed inside bearers.	Rollers covering		Price.
		Matter.	Entire Form.				Matter.	Entire Form.	
1	17×21 in.	13×17 in.	2	\$1,250	6	32×47 in.	27×42 in.	2	\$3,250
2	20×25 in.	15×20 in.	2	1,700	7	35×51 in.	30×46 in.	2	3,800
3	24×29 in.	19×24 in.	2	2,050	8	38×55 in.	33×50 in.	2	4,300
4	26×34 in.	21×29 in.	2	2,450	9	41×60 in.	36×55 in.	2	5,000
5	29×42 in.	24×37 in.	2	2,850					

Patent reversing motion, enabling the pressman to run the press backward without leaving the feed stand, \$100 extra for sizes from No. 1 to No. 5 inclusive; and for sizes above No. 5, \$150.

The prices include apparatus complete for steam power and boxing and shipping, or delivery, set up, in New-York; also, one extra set roller stocks and blanket.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
1	7 ft. 3 in.	5 ft. 7 in.	4 ft. 5 in.	About 2 tons.	1200 to 2500	$3\frac{3}{4}$
2	7 ft. 10 in.	5 ft. 11 in.	5 ft. 9 in.	About $2\frac{1}{2}$ tons.	1056 to 2200	1
3	9 ft. 7 in.	6 ft. 7 in.	5 ft. 4 in.	About $3\frac{1}{2}$ tons.	1125 to 2000	$1\frac{1}{2}$
4	10 ft. 7 in.	7 ft. 2 in.	5 ft. 9 in.	About 5 tons.	1068 to 1900	2
5	11 ft. 4 in.	8 ft.	6 ft. 2 in.	About $6\frac{1}{2}$ tons.	1012 to 1800	$2\frac{1}{2}$
6	12 ft. 7 in.	8 ft. 8 in.	6 ft. 8 in.	About 7 tons.	955 to 1700	3
7	13 ft. 11 in.	9 ft.	7 ft.	About 8 tons.	900 to 1600	$3\frac{1}{2}$
8	13 ft. 11 in.	9 ft. 5 in.	7 ft. 6 in.	About 9 tons.	840 to 1500	4



Hints on Making-Ready for Cylinder Presses . . . Continued from page 12.

before anything is done toward overlaying. If one or more pages are out of square, and hang or bow, have the error at once corrected. If the impression be too weak and the ink too pale to clearly show up faults, a temporary overlay over the weak spots and a sheet of damp proof paper behind the sheet for proof will bring them out plainly enough on the next impression. But put on extra impression with caution, if the form contains delicate types or wood-cuts. This press proof should be carefully examined by the foreman and approved as to margin and register. At this stage of the work, it is possible to correct a fault of margin or register; but if this correction be neglected or postponed until backing up, it becomes more difficult, and is sometimes impossible.

13. To set new tapes: pass the tape around and close to the cylinder. Lap it over one of the tape pulleys, and then pass it around the small guide pulley on the shaft above. To increase its tightness, throw up the guide pulley from the shaft, and set the binding screw more tightly. All these pulleys are movable on their shafts, and distance between them may be altered at pleasure. Let the tapes rest upon the outer margin of the sheet, and see that the overlays on the tympan over which the tapes pass are of equal thickness; if not equal, the sheet will wrinkle.

14. To set the fly: run through a sheet of the paper to be printed, and let it run down the fly, so far that it is barely held by the fly pulleys. Then set the cam which works the fly, so that its point just clears the small friction roller on the shaft, and it will throw down the sheet correctly. Tighten the spring according to the size of the sheet, and set the spring crank so that it will prevent the fly from striking too hard on the table.

15. On a newspaper form, the first impression against a sound packing should be fairly even, but there will be some weakness in the centre and some hardness at the edges. On a book form, or job form of irregular shape, a first impression so taken must be uneven. Before trying to correct the fault, consider the cause. Where the force of impression meets resistance on every side, as in the center of a form, it is

diffused and weakened. When this force meets the corner of a page, or an exposed rule, or the outer lines of a wood-cut, it meets but little resistance; it concentrates and makes a strong impression. The unevenness is evidence of irregular resistance in the form—an irregularity too often aided by over-high plates, types, or rules.

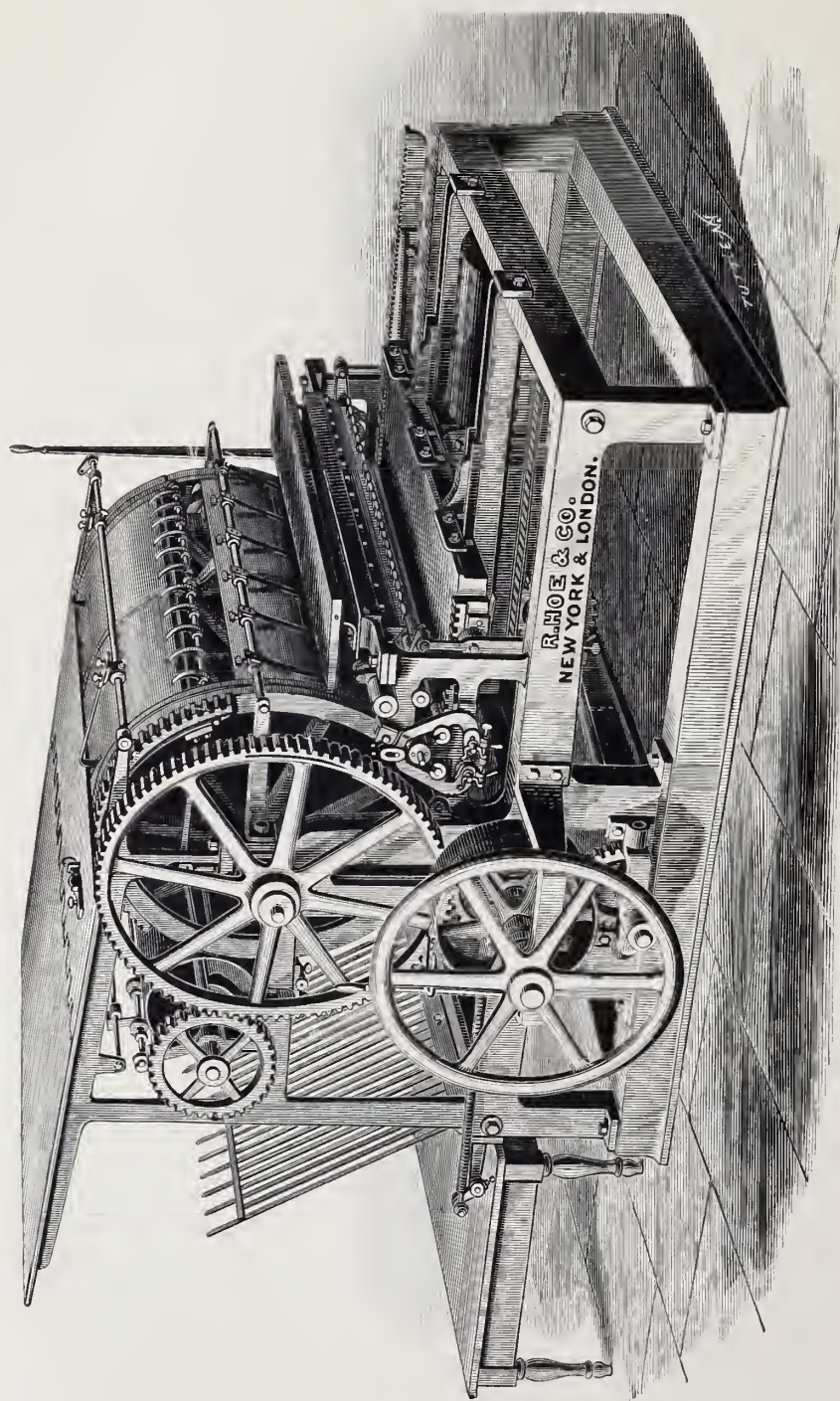
16. Weakness of impression may be corrected: 1. By turning down impression screws and putting on more impression, flattening down the high to bring up the low types—obviously a bad method. 2. By raising up the low types or plates with underlays of paper or card. 3. By stretching a thin rubber or woollen blanket over the fast packing, trusting to its elasticity to bring up the types that do not show. 4. By pasting overlays of paper of one or more thicknesses over every part of the packing that shows weakness.

17. The method of forcing impression by means of the impression screws is mentioned only to be condemned. A large form of wood type, of old plates, of diagrams on black ground, which has to be printed in haste, may seem to justify the turning of the screws; but the method is radically bad, as destructive to the press as to the type. The impression screws should be used for this purpose only in rare emergencies, and as the last resort. If they are frequently tampered with, the even bearing of the cylinder will soon be lost; the press will be strained in false bearings, and made incapable of giving even impressions.

18. The extra impression that may be required for work in haste can be quickest had by putting on a thin rubber or woollen blanket over the fast packing. This is a common but an unworkmanlike method. The extra blanket will shorten making-ready, but it wears the types or plates, and makes thick, coarse presswork. It is useful only on short editions. On a long edition the extra blanket will lose its elasticity before the work is half done; it will pack hard and require renewal. The single rubber blanket provided for the press is elastic enough for ordinary work. If it is not enough, put more paper over the fast packing. Avoid the common fault of novices, who put on too much impression at the start. *Making-ready for fine work should*

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NEWS AND JOB CYLINDER PRESS.

NEWS AND JOB CYLINDER PRESS.

This machine is intended for job and newspaper work, and will run at a speed of from 1000 to 1500 impressions per hour. In construction and finish it resembles the regular single large cylinder press, but is simpler. It has air springs. The cylinder is very strong, and the patent full-size segment, gearing into the rack on type bed, insures a perfect register, without slur. The finger motion is noiseless. The fly cam has a continuous surface, so that the fly rises and falls noiselessly.

This machine has the patent delivery cylinder, which dispenses entirely with the tapes around the cylinder.

It would be impossible, for the price charged, to make any more perfect or reliable machine.

Sizes and Prices.

No.	Bed inside bearers.	Matter.	Rollers covering Entire Form.	Price.
5	29 × 42 in.	24 × 37 in.	2	\$1,700
6½	33½ × 49 in.	28½ × 44 in.	2	2,000

The price includes boxing and shipping, or delivery, set up, in New-York; also, roller moulds and two sets of stocks.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
5	11 ft. 1 in.	6 ft. 7 in.	5 ft. 8 in.	About 4 tons.	600 to 1400	2
6½	12 ft. 6 in.	7 ft. 6 in.	6 ft. 2 in.	About 4½ tons.	400 to 1200	2½

CARE OF INKING ROLLERS.

CARE OF INKING ROLLERS. Good rollers are as necessary as a good press. On fast presses, the rollers should be harder than those provided for slow presses; but on either kind of press they should have a smooth, moist, clinging, elastic surface. Rollers with many fine cracks, or pin-holes, may serve for common newspaper work, but no skill of the pressman can make them do superior press-work. The best press-work always requires rollers that are as good as new. Before they are put in press, they should be tested, by lightly

passing the palm of a clean hand over the surface. If they soil the hand, they need cleaning; if dry and skinny, they need sponging; if wet and clammy, they should be lightly rubbed, and exposed to dry air. Glycerine rollers must be kept in a dry, and glue-and-molasses rollers in a damp, atmosphere. In cleaning, use lye sparingly, and never on a new roller; oil, benzine, or turpentine are better. Every press should have two sets of rollers, of different grades of firmness. Rollers should be made a week before use.

Hints on Making-Ready for Cylinder Presses . . . Continued from page 14.

always begin with a light impression. When the full force of the press is not exerted at the start, it is always easy, at any stage of making-ready, to overlay and increase impression anywhere; but when impression is full at the start, it is often impossible to take it off any point without destroying all the making-ready that has been done.

19. Find out whether the presswork desired is to be common, good, or fine, and how much time can be allowed for making-ready. The time allowed must determine the quality of the work. Begin by bringing up with underlays all lines of types or plates that are low. The underlay is to be preferred to the overlay only when it brings the low matter up to the inking rollers, as well as to impression. Cut underlays from proofs, which will show you where to cut and where to fasten them. The proper size and thickness of an underlay can be known only by experiment. Cut out of a proof every feebly printed spot, and fasten the part cut out on the feet of the type. The proof taken after such an underlay has been affixed should show improvement; but the centre may be, probably will be, still too feeble. To correct this, cut another underlay from the second proof, which will be of smaller size, and put it under the first. If this is not enough, cut and put on a third, taking care that the smallest shall always be next to the bed of the press. Avoid underlaying any part of the form which shows up fairly on the proof. At this stage of the work, do not put a needlessly thick underlay under a heavy-faced cut or type, because you think it will need much impression. This extra impression will be most fairly given by an overlay. Do not put a thick underlay under the corner or under one-half of a large type; for if the type rocks or tilts, as it probably will, under impression, the tilting will work up the furniture and quadrats. Use but little paste, for the moisture in it will swell the wood it touches. For very low lines or blocks, card-board is better than paper. Put all underlays on smoothly, without fold or wrinkle. When plates are on patent blocks, underlays may be freely used with excellent results; but the underlay should always be between the plate and the block. An underlay for a plate on a block should always be cut smaller than

is indicated by the feeble spot on the proof, for there is a spring in the plate beyond the surface underlaid, which will make up the deficiency. Do not underlay too much; one-fourth the surface of a type form is a large allowance. If more is attempted, the form is made springy, and this springiness will surely work up furniture.

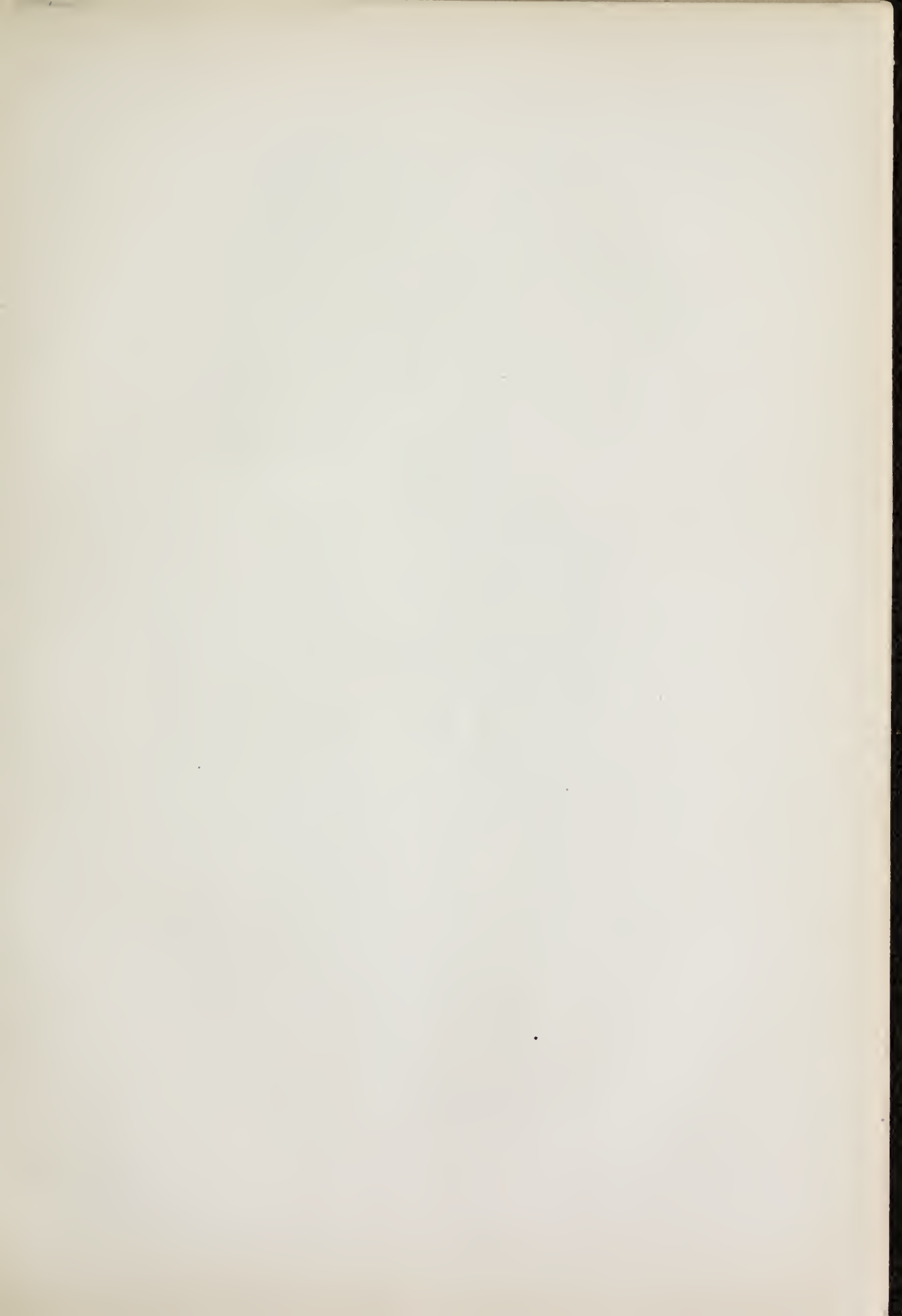
20. Some of the finishing work in underlaying, previously directed for plate forms, can be done more neatly on type forms by use of overlays. Where choice can be had, use overlays. The office of the underlay is the bringing up of low types or plates to inking rollers and reasonably even impression; the office of the overlay, the giving of finish and delicacy to impression.

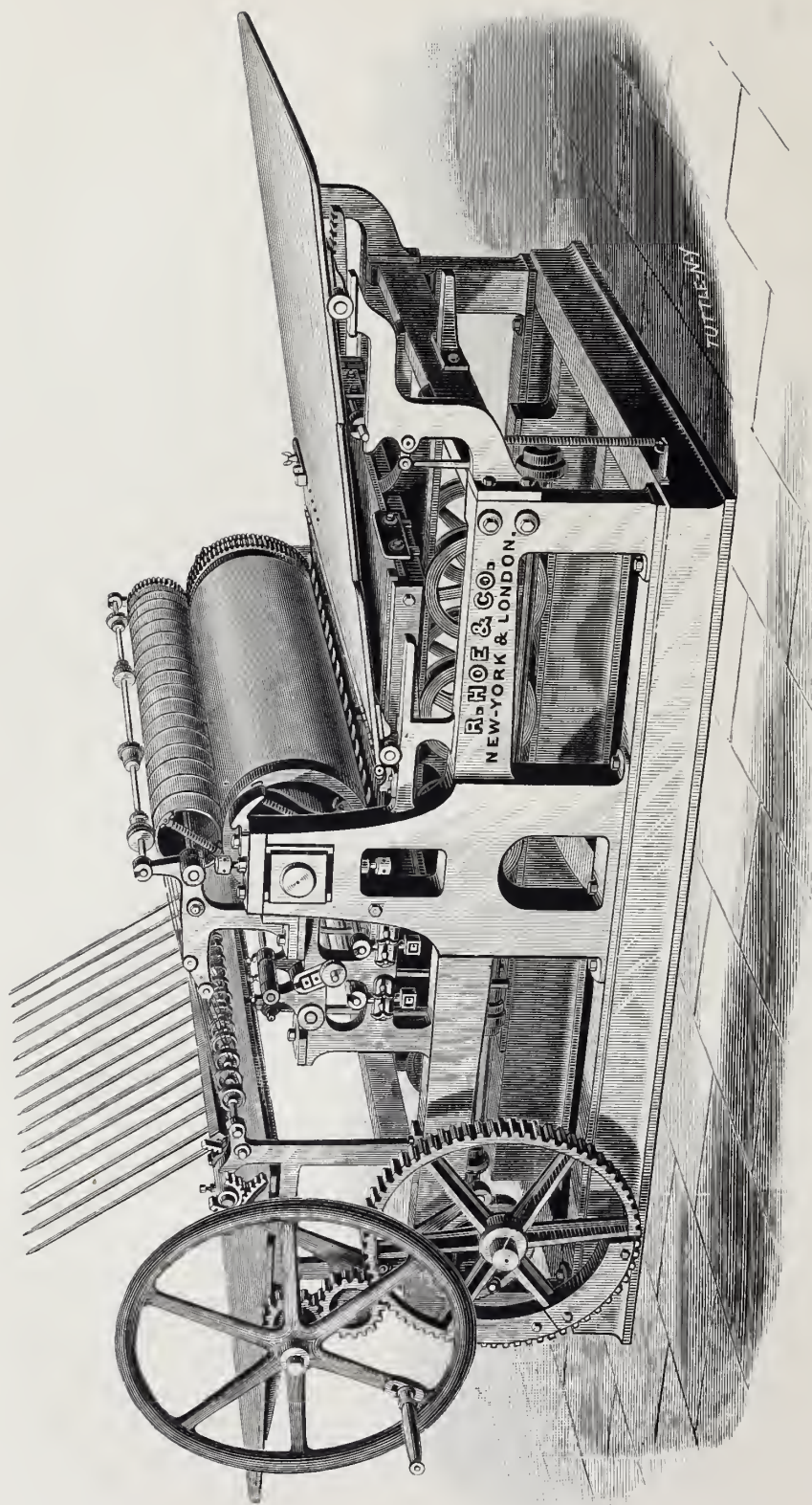
21. To overlay a form, first paste upon the gripper edge of the cylinder two sheets of thin, hard paper. Take a pale proof on the paper provided for the work, observing all the directions previously given concerning margins. When margins are correct, take two proofs, one on thick and one on thin paper. Wherever there appears a decided weakness of impression on the proof, cut the weak part out, and neatly paste it down on the sheet next to the fast packing. Use a sharp knife, and cut upon a smooth surface, making no torn or ragged edges. If the work is fine, pare down the edges, so that the next proof will not show a sudden change of impression surface. Wherever there is but slight feebleness of impression, cut the overlay for it out of thin paper, and affix it in its place. Put on overlays smoothly: they are worse than useless if they bag or wrinkle. If an overlay has been badly placed, regard it as beyond repair. Do not try to patch it; tear all off and begin anew.

22. When the more conspicuous defects of impression have been overlaid, take other proofs on thin paper, and examine them for minor faults. From these proofs cut new overlays, which put on in the same manner, until a sufficiently even impression is obtained. If at any stage of the work any rule or letter shows too high, cut it out of the packing sheets. If this cutting out does not sufficiently reduce impression, have the faulty letter taken out of the form, and have the batter (the usual cause) cut off.

23. For all work on wet paper printed against an elastic packing, overlays may be

Continued on page 18.





TWO-ROLLER STOP-CYLINDER PRESS.

TWO-ROLLER STOP-CYLINDER PRESS.

This is an excellent, low-priced, stop-cylinder machine, of an entirely new design throughout. It is capable of doing well, and at a fair speed, up to 1200 impressions per hour, all the book, newspaper, and job work required in the smaller class of printing offices. It is strong, simple, and convenient, and so low that the attendant stands directly on the floor. The distribution is cylindrical, and the two inking rollers pass completely over the form. The sheets are fed to the under side of the impression cylinder, which arrangement gives to the bed a short travel, and thus makes it a machine easy to run by hand. The feed table draws back to facilitate feeding the sheets to a gauge, and advances to present them to the fingers just before the impression cylinder starts. A fly cylinder with fingers receives the sheets and delivers them to a fly, so that no tapes pass around the impression cylinder.

A No. 6½ machine can be run by hand from 700 to 800 impressions per hour, and by power at 1000 to 1200 per hour; and at such speed it is almost noiseless.

Sizes and Prices.

No.	Bed inside bearers.	Matter.	Rollers covering Entire Form.	Price.
5	29 × 42 in.	24 × 37 in.	2	\$1,000
6½	33½ × 49 in.	28½ × 44 in.	2	1,250

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
5	11 ft.	7 ft. 7 in.	4 ft.	About 4½ tons.	1000 to 1400	1½
6½	12 ft.	8 ft. 6 in.	4 ft. 6 in.	About 5 tons.	850 to 1200	1½

BEFORE MAKING-READY.

BEFORE PUTTING ON THE FORM, see that it is perfectly clean, both on face and feet. The cleaning and oiling of every part of the press that meets with friction should have been attended to before. A clean press—not clean on the outside only, but clean in all its working parts—is the first condition of good press-work.

When the form has been fastened on the bed, brush it over, and free it from the dust that fouls the rollers. If types, plates, or cuts are clogged with ink left after a careless washing, have the ink removed

with benzine. Do not neglect the bottom of the form. Brush that also, and see that no bits of paper or particles of sand or plaster stick to it.

HAVE GOOD PLATES. If the form contains plates, some of which are too high and others too low, or if the plates are badly sized, unequal as to heads, widths, and bevells, have corrections made by the electrotypier. It will take the pressman twice as long as it would the electrotypier to correct these faults, nor can the pressman do the work as well.

Hints on Making-Ready for Cylinder Presses . . . Continued from page 16.

cut in large masses. For fine work, on dry paper, against hard packing, the overlays should be smaller and on thin paper. For the finest work, overlays are often needed for single letters and parts of letters, and they should often be of tissue paper.

24. Do not overlay hurriedly. It is the fault of a novice to cut overlays out of too thick paper, and to put them on in spots where they are not needed. An overlay so put on acts like an over-high type or bearer; it bears off the impression from other quarters; it increases work, and makes the impression more uneven than before. Overlaying on hard packing should be done gradually, and a proof should be taken after each overlay has been put on. The pressmen who plan work for two or three layers of overlays will make fewer mistakes than those who try to do the work with one.

25. Do not overlay too much. Never make an overlay higher than the raised flange at the ends of the cylinder. If made higher, the circumference of the cylinder is so increased that it will not travel evenly with the bed. The high overlay will be moved by the scraping pressure necessarily produced, and the print will slur or mackle.

26. WOOD-CUT PRINTING. A form of electrotyped wood-cuts, or of cuts and type, can be made ready on the cylinder by the method of overlaying previously described, but necessarily at great sacrifice of time. To save delay on press, the overlays of the cuts should have been made before the form is laid on the bed. By this method, the wood-cuts or their electrotypes (the wood should never be sent to press on a cylinder) should be proved on a hand press on varying thicknesses of paper. Out of these proofs the overlays should be cut, the cutter following the lead of the engraver. Where the lines are thin, wide, and sharp, that part of the overlay should have but one thickness of very thin paper, or, in many instances, none at all, and be cut out entirely. Those parts of the cut that are black and solid should have four or five thicknesses of thick paper. The thicknesses on the blackish grays, the middle tint, and the pale grays should be diminished to correspond with their diminishing color. These separate overlays should be pasted neatly one over the other, so arranged that the overlay for the palest gray

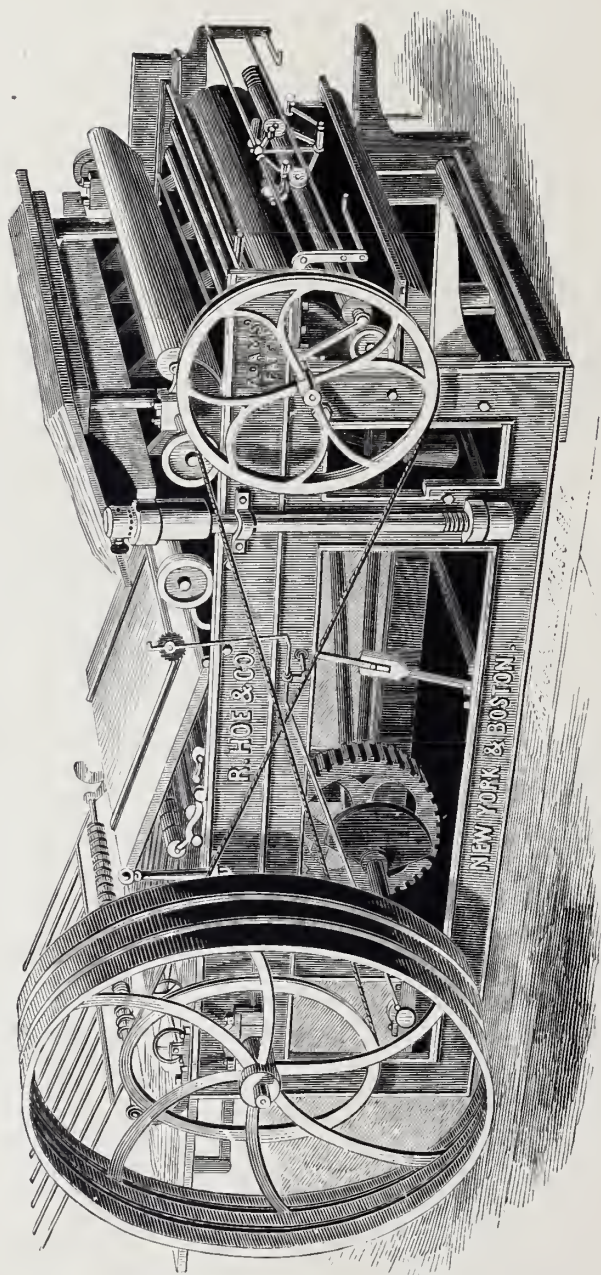
shall be nearest the face of the cut. This general rule will serve for mechanical cuts, but not for landscapes. The management of receding perspective, the subduing of a foreground, the keeping up of nice distinctions in the paler grays of sky, clouds, and water, require special skill in the arrangement of the overlays, for which no rules can be given. If the overlay cutter does not have a nice perception of the proper relations of light and shade, and of tints in masses, he will not succeed in overlaying. To school the eye to this nice perception, he should note the effect of different tints in the proof as seen from the distant standpoint of eight or ten feet.

27. When the overlays have been cut, they should be smoothly pasted down on the sheet over hard packing. It is, of course, possible to print wood-cuts against an elastic packing, but the impression had therefrom, although it may be fine or good in the blacks, will not be pure or clean on the sharp lines or pale grays. The first proof from a form of cuts, fairly overlaid as here directed, will usually be satisfactory, and will rarely require patching or alteration. But this satisfaction is gained at the expense of the type work around the cuts. The putting on of four or five overlays to produce deep black bears off impression from many parts of the form, making the type work very uneven in impression. To correct this fault it is necessary to put overlays over all the weak spots, as previously directed, but with greater care than is usually given to type forms. It is slow work. A large form, containing many fine cuts, may require three or more days for making-ready (after the overlays of the cuts have been prepared and put on), if done, as it should be done, with such care that no indentation by impression shall appear on the back of the printed sheet. The time apparently lost by this treatment is in many cases really time saved, for it makes unnecessary a dry-pressing of the printed sheets.

28. The large and simpler wood-cuts of weekly newspapers, which have to be printed in haste, can be made ready much more quickly by taking the preliminary proofs on a prepared card-board made for the purpose, which can be readily peeled and separated in three or more layers. In preparing an overlay on card, the solid

Continued on page 21.





BED AND PLATEN POWER BOOK PRESS.

BED AND PLATEN POWER BOOK PRESS.

The bed and platen press now manufactured by us is based upon that originally made and patented by Isaac Adams, of Boston.

The improvements we have added and patented during the last few years make it essentially a new machine. Two thousand pounds have been added to the weight of an average-sized press, which gives greater solidity and exactness of impression.

There are also important improvements in the distribution, by which two form rollers will now do work almost equal to four upon one of the old machines.

A fountain for expensive colored work has been constructed, in which the ink lies upon the knife in full view, so that very little is required to start the press. It is quickly cleaned and without waste of ink.

There is no question that in the bed and platen press the wear and tear of type, or electrotype and stereotype plates, is reduced to a minimum, and for printing books, especially when short numbers are required, it is, and will continue to be, the most economical and desirable machine.

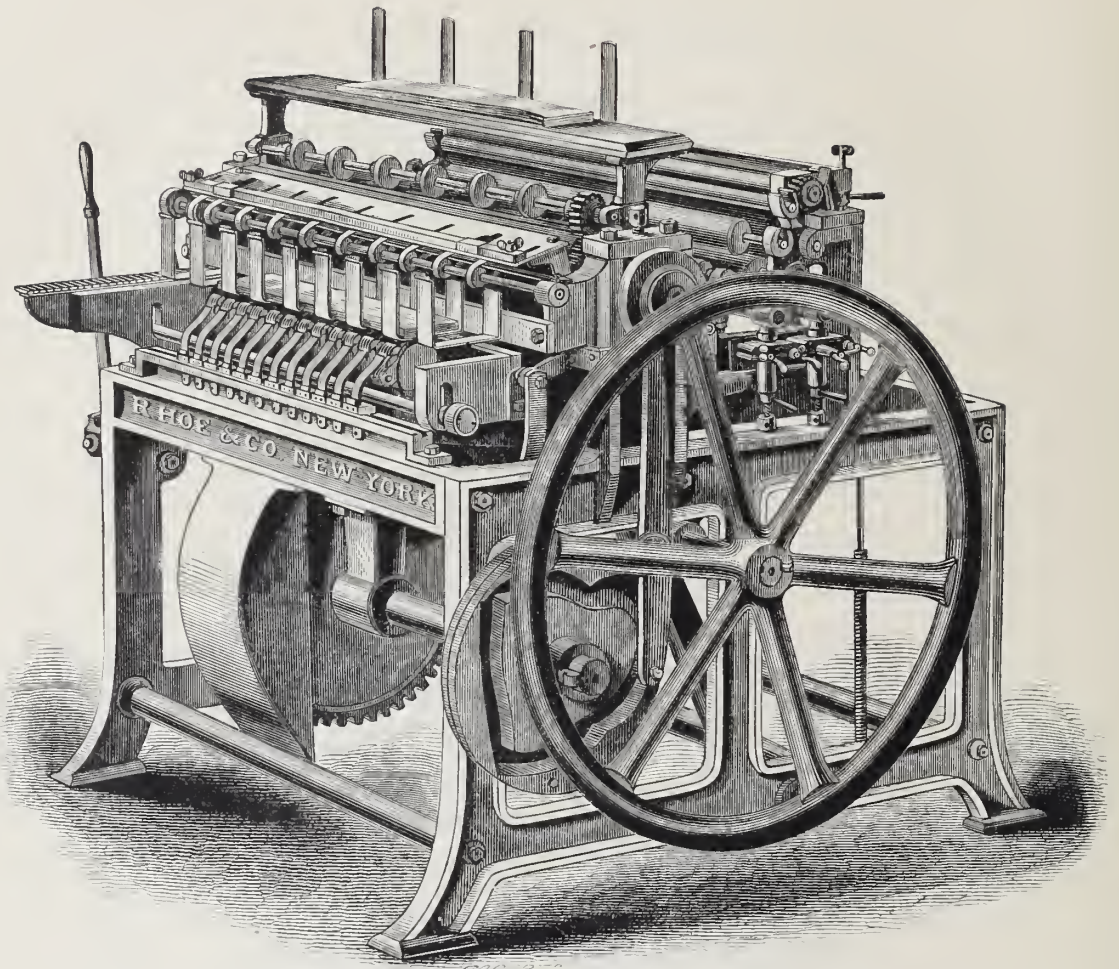
Sizes and Prices.

No.	Size of Platen.	Rollers.	Price.	No.	Size of Platen.	Rollers.	Price.
1 . .	14×18 inches	2	\$800	38 . .	29×43 inches	2	\$3,000
4 . .	19×25 inches	2	1,900	39 . .	29×43 inches	4	3,300
5 . .	19×25 inches	4	2,150	47 . .	31×45 inches	2	3,300
6 . .	20×25 inches	2	2,000	48 . .	31×45 inches	4	3,600
7 . .	20×25 inches	4	2,250	50 . .	32×46 inches	2	3,600
11 . .	24×29½ inches	2	2,250	51 . .	32×46 inches	4	4,000
12 . .	24×29½ inches	4	2,500	52 . .	35×49 inches	2	4,000
29 . .	27×41 inches	2	2,700	53 . .	35×49 inches	4	4,500
30 . .	27×41 inches	4	3,000				

The above prices include two friskets, two sets stocks, and four sets of nippers of three each, but no roller mould nor blanket.

Dimensions, Weight, Speed, and Power.

	Over all.			Approximate weight, bxd., including steam fix't's.	Speed.	Horse power.	Rollers.
	Length.	Width.	Height.				
26×40 in.	13 ft.	6 ft. 8 in.	5 ft. 10 in.	5½ tons.	660 to 1020	1	2
27×43 in.	13 ft.	7 ft. 2 in.	6 ft. 8 in.	6½ tons.	660 to 1020	1	2
27×41 in.	13 ft.	6 ft. 8 in.	5 ft. 10 in.	6 tons.	660 to 1020	1½	2
27×41 in.	14 ft. 6 in.	7 ft. 4 in.	6 ft.	6½ tons.	480 to 840	2	4
29×43 in.	15 ft.	7 ft. 6 in.	6 ft.	7½ tons.	480 to 840	2½	4



PATENT RAILWAY COUPON TICKET MACHINE.

This simple modification of our well-known cylinder press will print with ease at the rate of twelve hundred per hour. The paper, laid by the operator sheet by sheet upon the feed table, is delivered automatically to the cylinder, printed, numbered, perforated, brought back and laid down, printed side up, upon the rack under the eye of the attendant. The form and numbering wheels are on the same bed, and receive their ink from the same rollers. The impression cylinder gears into the bed, turning forward and backward with it, and instead of fingers has cords, that run around in the spaces between the coupons. A numbering plate is arranged for each different spacing of coupons, so that no time is lost in adjusting the wheels. Local tickets can be printed in strips, and afterward cut up.

For sizes and prices, see next page.

Railway Coupon Ticket Machine, continued. Sizes and Prices.

No.	Size of bed.	Size of matter.	Number of coupons that can be printed with wheels numbering up to			Price.
			10,000.	100,000.	1,000,000.	
1 . .	7 × 29 inches	3 × 27 inches	29	25	23	\$1,750.00
2 . .	9 × 32 inches	5½ × 30 inches	32	28	26	2,250.00

Prices include one chase, apparatus for steam power, and boxing and carting, but no numbering wheels or perforators.

Price of wheels to number up to 10,000, with perforators . . .	Per set. \$50.00
Price of wheels to number up to 100,000, with perforators . . .	70.00
Price of wheels to number up to 1,000,000, with perforators . . .	90.00

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
1	4 ft.	4 ft. 9 in.	3 ft. 8 in.	About 1½ tons.	843 to 1500	¾
2	5 ft.	5 ft. 1 in.	3 ft. 8 in.	About 2 tons.	540 to 1200	1

Hints on Making-Ready for Cylinder Presses . . . Continued from page 18.

blacks are left on, and the grays are peeled up and thrown out. Over overlays so cut, and affixed to cylinder, a thin billiard-cloth is stretched, the elasticity of which makes up the deficiencies of making-ready.

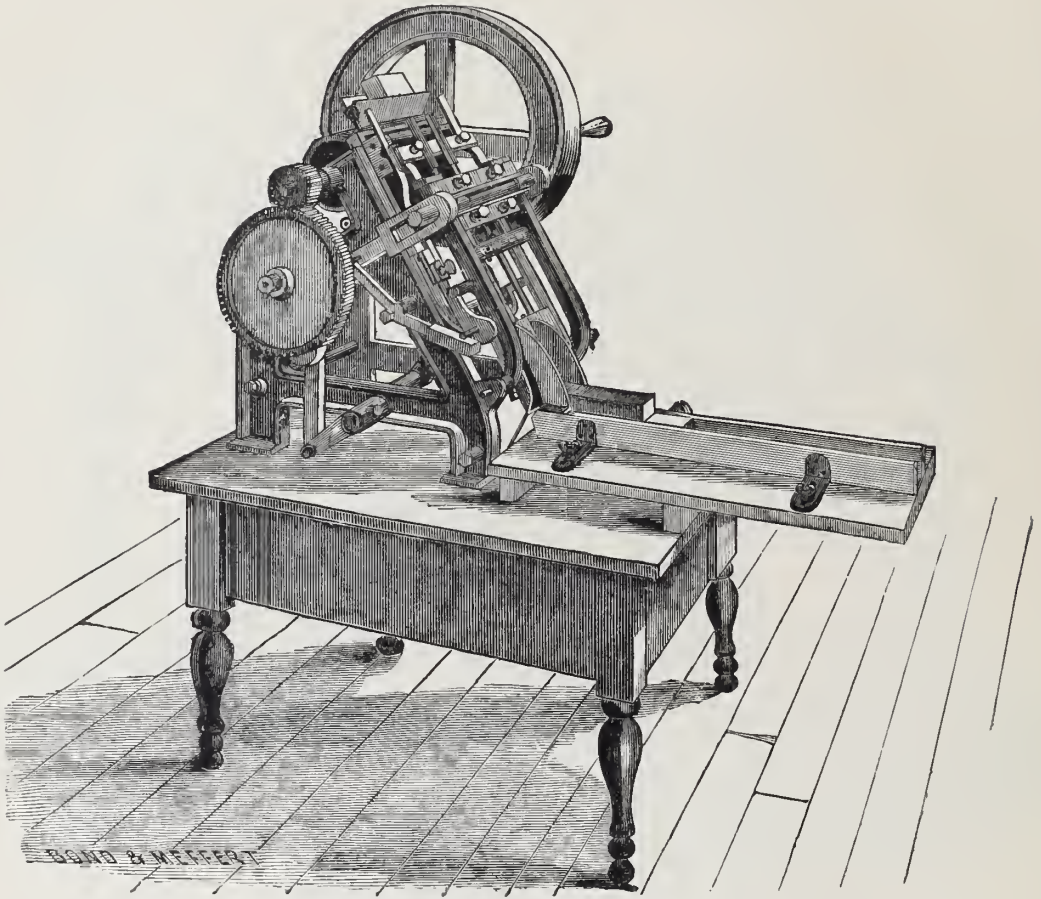
29. Do not try to correct the faults of hurried making-ready by a weak impression, and by carrying an excess of ink to hide the weakness. Excess of ink fouls the rollers, clogs the types, and makes the printed work smear or set off. A good print cannot be had when the impression is so weak that the paper barely touches the ink on the types and is not pressed against the types. There must be force enough to transfer the ink not only on the paper but in the paper. A firm impression should be had, even if paper be indented.

30. The amount of impression required will largely depend on the making-ready. With careful making-ready, impression may be light; roughly and hurriedly done, it must be hard. Indentation is evidence of wear to type. The spring and the resulting friction of an elastic impression surface is most felt where there is least resistance, at the

upper and lower ends of lines of type, where they begin to round off. It follows that the saving of time that may be gained by hurried and rough making-ready must be offset by an increased wear of type.

31. That impression is best for preventing wear of type which is confined to its surface and never laps over its edges. But this perfect surface impression is possible only on a large form with new type, sound hard packing, and ample time for making-ready. If types are worn, the indentation of paper by impression cannot be entirely prevented.

32. Good presswork does not depend entirely upon the press—nor on the workman, nor the materials. Nor will superiority in any one point compensate for deficiency in another; new type will suffer from a poor roller, and careful making-ready is thrown away if poor ink be used. It is necessary that all materials should be good; that they should be adapted to each other, and fitly used. A good workman can do much with poor materials, but a neglect to comply with one condition often produces as bad a result as the neglect of all.



PATENT TABLE CARD PRESS.

WITH OR WITHOUT NUMBERING AND COUPON ATTACHMENT.

In this press the form is placed on an inclined bed, and receives ink from two rollers, impression being given by a cam and regulated by platen screws. It has adjustable feed guides, a large distributing cylinder, card rack and receiver, and is well adapted for long service. The removal of a bar, easily effected, allows the platen and guides to be thrown back, uncovering the bed and rollers.

An attachment is furnished, when ordered, which, at one operation, prints and numbers single local tickets or coupons of two to four tickets, depositing them in a trough in consecutive order. Speed, two thousand impressions per hour.

CARD PRESS WITHOUT NUMBERING ATTACHMENT.

Dimensions, inside chase	$3\frac{3}{4} \times 4\frac{3}{4}$ inches.
Largest card printed	$4 \times 4\frac{3}{4}$ inches.
Smallest card printed	$1\frac{1}{4} \times 2\frac{1}{2}$ inches.
Price	\$80.00 | Table, extra \$10.00

NUMBERING CARD PRESS WITH TABLE.

(As shown on page 22.)

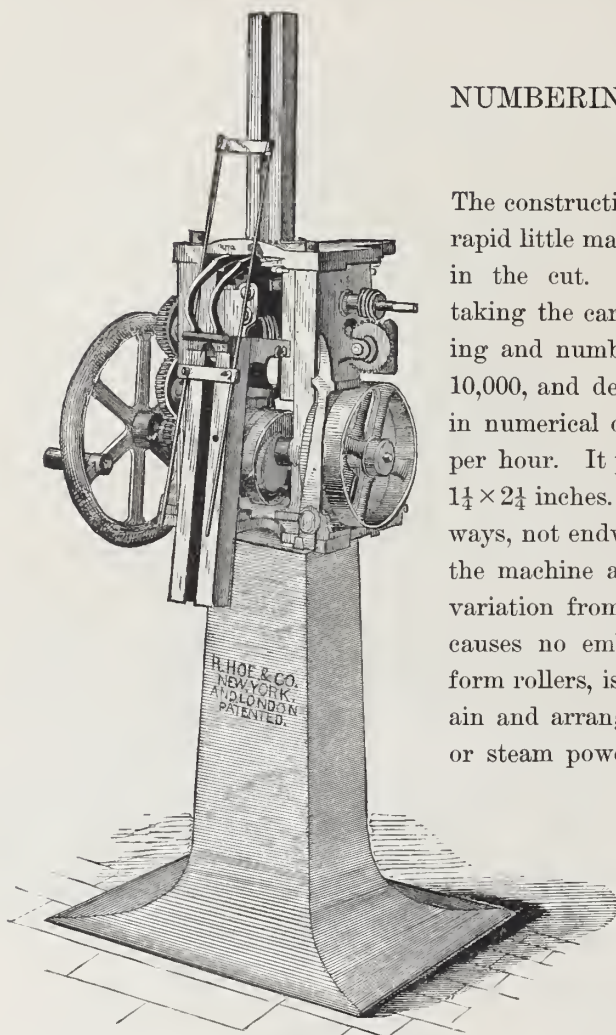
Dimensions, inside chase			$4\frac{1}{8} \times 5\frac{3}{4}$ inches.
Largest card printed			$4\frac{3}{4} \times 5\frac{3}{4}$ inches.
Smallest card printed			$1\frac{1}{4} \times 2\frac{1}{4}$ inches.
			Numbering wheels, per set.
Arranged for cards or local	{	Numbering up to	Price.
tickets		100,000	\$400.00
		1,000,000	425.00
			80.00

NUMBERING CARD PRESS WITH TABLE AND COUPON ATTACHMENT.

Dimensions of largest card printed	$4\frac{3}{4} \times 5\frac{3}{4}$ inches.		
Smallest coupon printed	$1\frac{3}{8} \times 2\frac{1}{4}$ inches.		
	Numbering wheels, per set.		
Arranged to print either single	Numbering up to	Price.	
cards or from two to four	10,000	\$375.00	\$40.00
coupons	100,000	455.00	60.00
	1,000,000	535.00	80.00

All the above prices include roller mould, two sets of roller stocks, chase, and boxing and carting.

Driving pulley, tight and loose pulleys, counter-shaft hangers, and two cone pulleys for steam power, extra, \$25. Extra chases, \$1 each.



Numbering Ticket Press.

NUMBERING TICKET PRESS.

The construction of this convenient and rapid little machine is sufficiently shown in the cut. It is entirely self-acting, taking the cards from a receiver, printing and numbering in one color up to 10,000, and depositing, face uppermost, in numerical order, at the rate of 10,000 per hour. It prints only one size, viz., $1\frac{1}{4} \times 2\frac{1}{4}$ inches. The tickets pass in sideways, not endways, and only two are in the machine at once, so that a trifling variation from perfect accuracy in size causes no embarrassment. It has two form rollers, is provided with ink fountain and arranged to run either by hand or steam power.

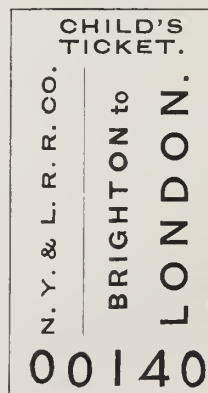
Weight, boxed, 625 lbs.

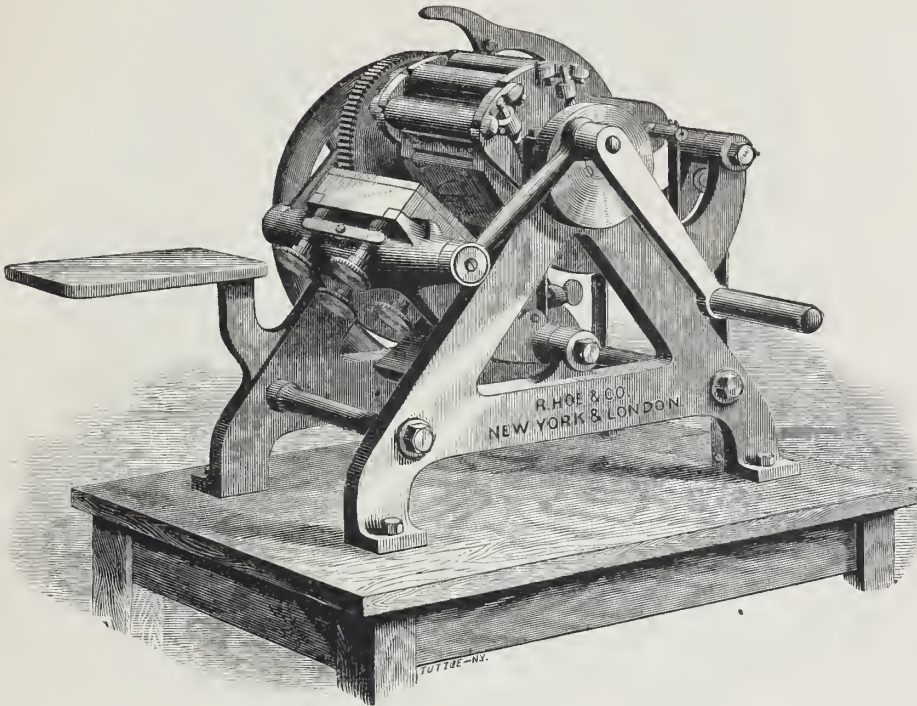
Price . . . \$700.00

Delivered boxed, or set up in running order in New-York.

SAMPLE CARDS,

Showing face and arrangement of the numbering figures.





DIAMOND CARD PRESS.

This machine is one of the most simple, durable, convenient, and expeditious of card presses, and will do the best of work.

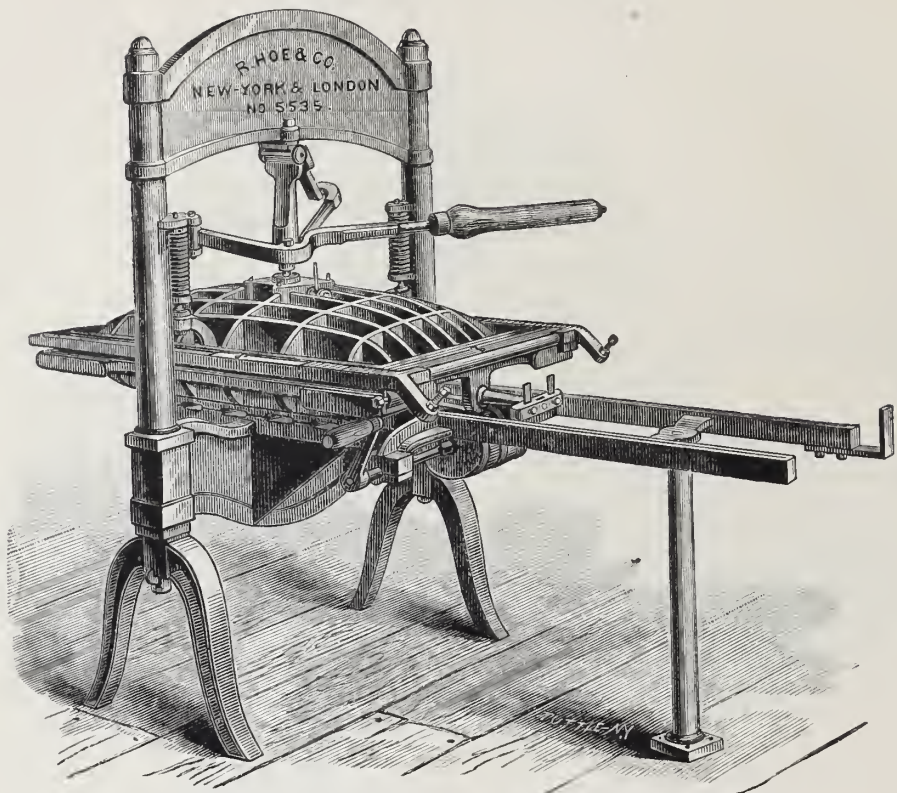
Size inside chase $2\frac{3}{4} \times 4\frac{3}{4}$ inches.
 Card $3\frac{3}{4} \times 4\frac{3}{4}$ inches, and smaller.
 Price \$80.00

Above price includes roller mould, two sets of stocks, chase, and boxing and carting. Extra chases, slotted and finished with steel set screws, \$3 each.

WARRANTED ROLLER MOULDS.

Diameter for hand presses, $3\frac{1}{2}$ inches. Price, per inch, 40 cents.

No.	Length.	Price.	No.	Length.	Price.
1	20 inches	\$8.00	6	48 inches	\$19.20
2	24 inches	9.60	7	52 inches	20.80
3	28 inches	11.20	8	56 inches	22.40
4	34 inches	13.60	9	61 inches	24.40
5	42 inches	16.80			



WASHINGTON HAND PRINTING PRESS.

The celebrity which our patent Washington and Smith hand presses have obtained during the last forty years renders any remarks upon their superiority unnecessary. They are elegant in appearance, simple, quick, and powerful in operation, and combine every facility for the production of superior printing.

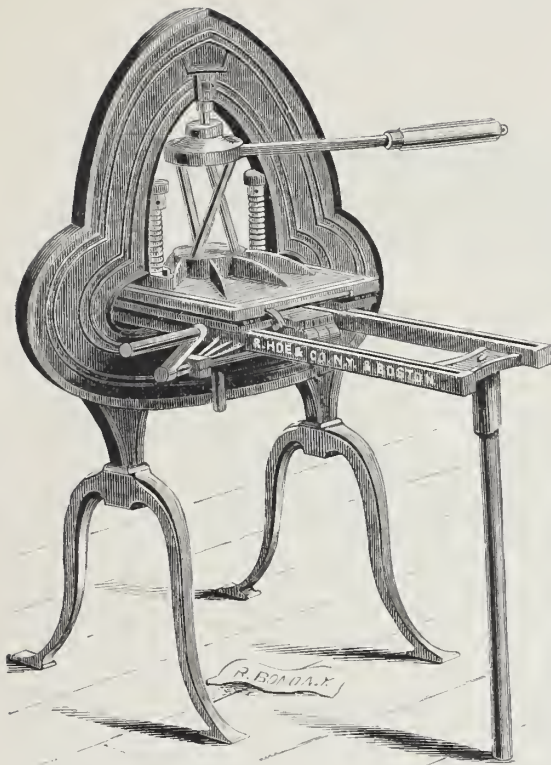
Dimensions and Prices.

No.	Bed.	Platen.	Price.	No.	Bed.	Platen.	Price.
1	17 × 21 in.	14 × 18 in.	\$150.00	5½	30 × 44 in.	26 × 40 in.	\$260.00
2	20 × 25 in.	16 × 21 in.	175.00	6	32 × 47 in.	28 × 43 in.	275.00
3	24 × 29 in.	20 × 25 in.	200.00	7	35 × 51 in.	31 × 47 in.	300.00
4	26 × 34 in.	22 × 30 in.	225.00	8	38 × 55 in.	34 × 51 in.	350.00
4½	27 × 39 in.	23 × 35 in.	240.00	9	41 × 60 in.	37 × 56 in.	400.00
5	29 × 42 in.	25 × 38 in.	250.00				

Price includes two pairs of points, one screw wrench and brayer, one wood roller, one slice, one ink block, one extra frisket, and boxing and cartage. Extra for making frame in pieces and boxing in small boxes, \$15 to \$25.

Per pair.					
Points with springs	.	.	40 cents.	Extra for constructing bed to run on rollers, from	
Points without springs	.	.	25 cents.		
Tympan bolt and nut	.	.	40 cents.	No. 4 up	\$40.00

For prices of roller moulds, see page 58; and of chases, see page 42.



Stansbury Press.

STANSBURY PRESS.

Bed . . . 16 × 20 inches.
Platen . . 13 × 17 inches.

Price, \$125.

Price includes impression pin, screw wrench, pair spring points, and boxing and carting.

Roller mould, extra, 22 inches, \$8.80. Chases, extra.

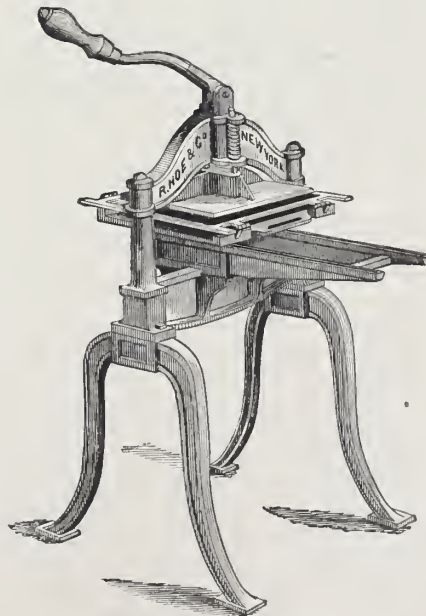
HAND LEVER PRESS.

No.	Bed.	Platen.	Price.
1	10 × 13 in.	7 × 10 in.	\$75.00
2	14 × 17 in.	10 × 14 in.	90.00
3	14 × 17 in.	. .	110.00

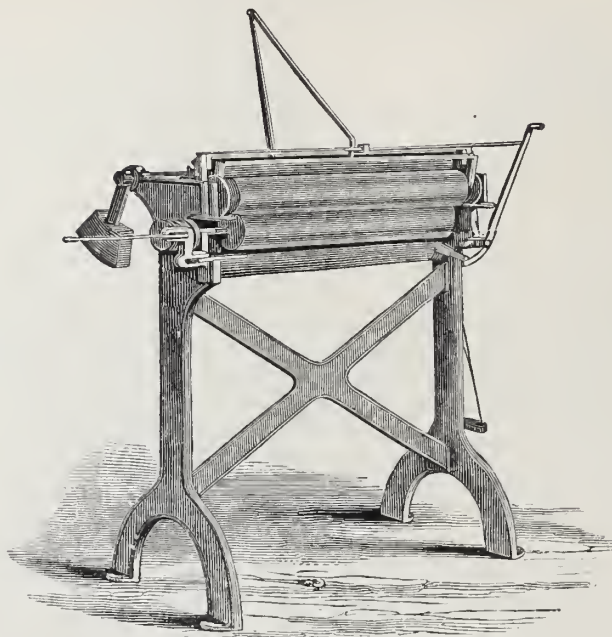
The No. 3 is extra heavy, for cutting gloves or printing cigar-box covers.

Prices include impression pin and boxing.

Roller mould, extra. For No. 1, fifteen inches, \$6; for No. 2, eighteen inches, \$7.20. Chases, extra.



Hand Lever Press.



PATENT SELF INKER.

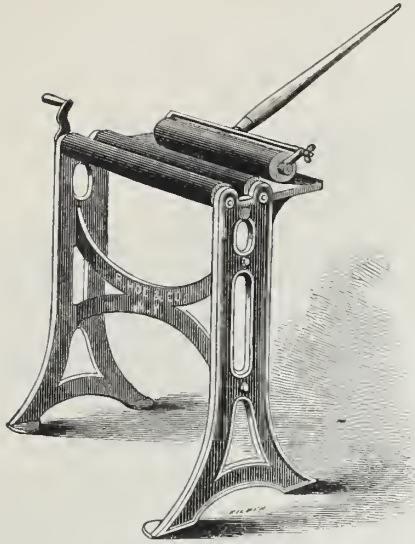
By attaching this machine to a Washington hand press the form is inked by the pulling of the impression.

No.	Price.	No.	Price.	No.	Price.	No.	Price.	No.	Price.
1 . .	\$110	3 . .	\$130	4½ . .	\$150	5½ . .	\$170	7 . .	\$190
2 . .	120	4 . .	140	5 . .	160	6 . .	180	8 . .	200

HINTS TO BUYERS.

See that the machine offered for sale, whether new or second-hand, is strong and well made. Consider the standing of the maker, both as mechanician and machinist. A light-framed or shakily-fitted machine will be dear at any price. Do not be deceived by any beauty of paint or finish on exposed work, which adds nothing to the usefulness of the machine, and which may draw the eye from an examination of the working parts. Uncover the boxes, and see whether the finish of shafts in their bearings, and of journals, is as smooth and true as the white and brass work of more exposed pieces. Take out, here and there, screws and bolts; see if the threads are deep, sharp, and clean-fitting. Look closely at the fitting of all toothed or pinion wheels; note whether they have been cast and filed to fit, or whether they have been accu-

rately cut by automatic machinery, so that they will fit in any position. Slowly turn pinion wheels, and note whether there is any rattling or lost motion, or whether the teeth fit snugly, yet freely, so as to give even, steady motion. Closely examine all castings for pinholes or air bubbles, which may be most easily detected in work that has been planed. See that castings are heavy as well as solid. Look after oil holes and provision for oiling. See that castings are neatly fitted; that they do not show the marks of the hammer or file, which must be used to connect them if they have been forced or badly put together. Pay attention to the noise made by the machine when in motion; if fairly fitted, the noise will be uniform; if badly fitted, it will be variable or grating.



Common Distributor.

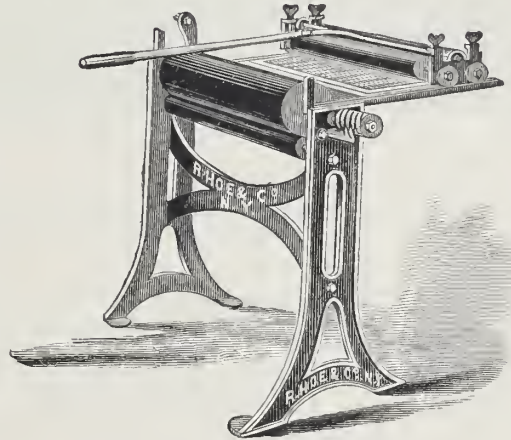
COMMON DISTRIBUTOR.

No.	Price.
1	\$15.00
2	16.50
3	18.00
4	19.50
4½	21.00
5	22.50
5½	24.00
6	25.50
7	27.00
8	28.50

HAND INKER FOR
HAND PRESS.

With vibrating cylinder, railway, and carriage to work two ink rollers.

No.	Price.	No.	Price.
1 . . .	\$30.00	5 . . .	\$55.00
2 . . .	35.00	5½ . . .	60.00
3 . . .	40.00	6 . . .	65.00
4 . . .	45.00	7 . . .	70.00
4½ . . .	50.00	8 . . .	75.00

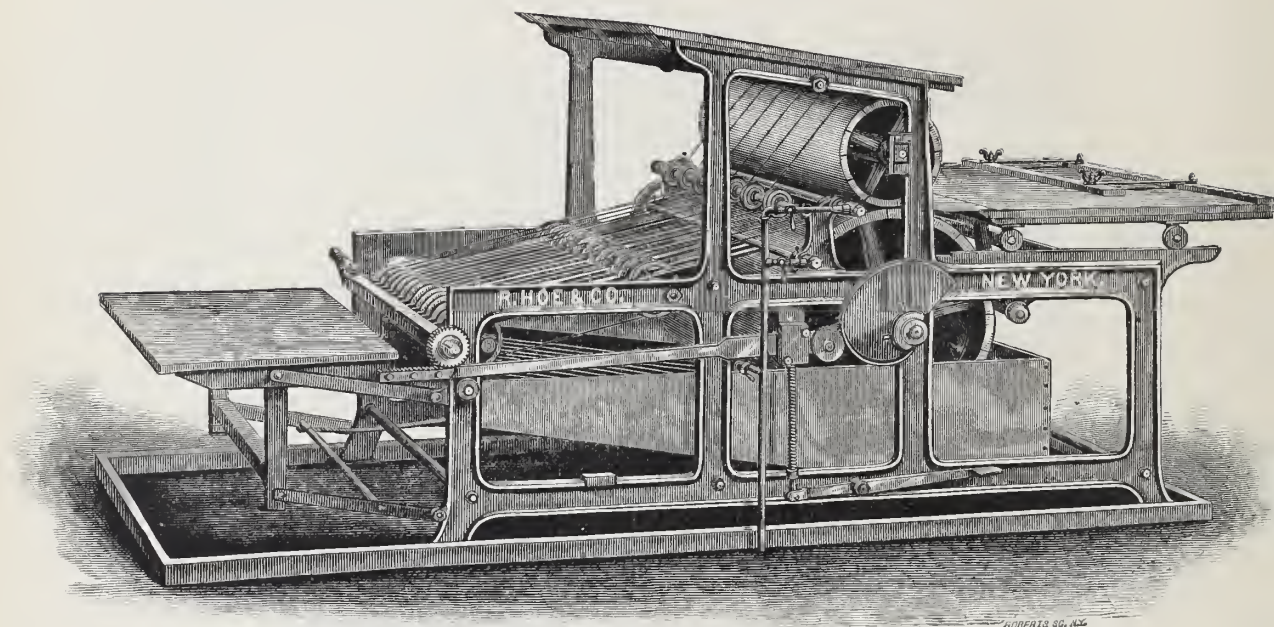


Hand Inker for Hand Press.

ABOUT CHOICE OF INK.

Ink should always be selected to suit the paper it will be used upon: for cheap paper, cheap ink; for fine paper, fine ink. At least three qualities—book, news, and fine job—should always be kept in stock by a printer who does miscellaneous work. Other qualities will often be needed. The speed of a press will be largely controlled by the ink. If it is oily or gritty, if it dries on rollers, or sets-off, or does not dry quickly, or does not keep its color on paper, it will seriously hinder the press-

man. As the finest black inks are usually of stiff body, and distribute with difficulty, they can be used to advantage only on presses that have ample provision for distribution. When ink of this nature is provided for paper of soft stock, the speed of the press must be reduced, to prevent the ink from tearing the paper when the paper leaves the form after impression. Ink tables need frequent cleaning, and the ink fountain should always be covered, to keep out the dust and floating particles of paper.



PATENT PAPER WETTING MACHINE.

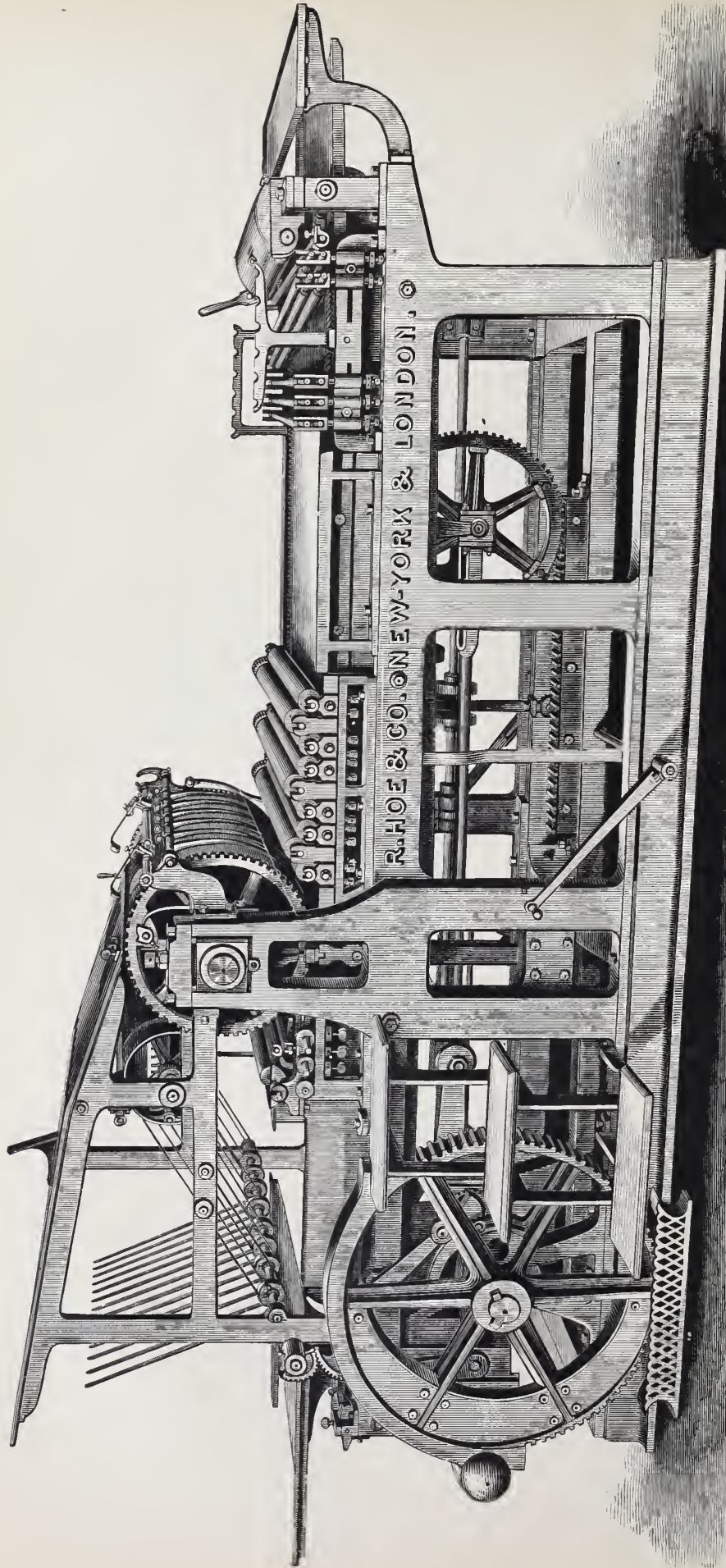
The bundle of paper is placed on the bank, and fed in quires, either open or folded, to guides on the feed table. At the proper time the table advances and enters the paper between two cylinders covered with felt, the lower one of which runs in a trough of water. As the paper issues from these cylinders, it passes between a top and bottom sprinkler, by which additional water can be put on, and the quantity can be regulated at pleasure. The paper is then conveyed by cords to a sheet flyer, which lays it on a table suspended on springs. These springs are readily adjusted to suit the weight of the paper, so that the table falls as the weight increases, and thus keeps the top of the pile always at the same height.

Dimensions and Prices.

No. 1 will wet paper 24×36 inches	\$550.00
No. 2 will wet paper 32×48 inches	600.00
No. 3 will wet paper 40×60 inches	650.00

The price includes counter-shaft, hangers, and pulleys.





PATENT LITHOGRAPHIC POWER PRESS.

A 2742 N. 1. - 50-114

PATENT LITHOGRAPHIC POWER PRESS.

The machine, in style and operation, resembles our stop-cylinder wood-cut press.

The stone is placed in the travelling bed, on a plate which is adjustable vertically to suit the varying and uneven thickness of the stones, and these can also be moved laterally by set screws, without altering their height.

The impression cylinder gears into a rack on the side of the bed, and is never altered in height, the stone being set instead. There is no danger of the stones getting broken, or scratched, the cylinder having rubber cushions to compensate for any unevenness in their surface, and the points of the fingers lying in a recess out of reach.

The patent cylinder clamp causes the impression cylinder to stop without jar and stand without tremor.

By means of a brake to be worked by the foot, the machine can be stopped immediately.

By an improved arrangement, the form rollers have bearings adjustable by set screws, so as to give the desired pressure, and are driven by contact with the distributing rollers, which are geared into the side rack of the bed. This mode of driving prevents any wiping of the ink upon the stone, and gives a perfect distribution of ink.

The damping apparatus is self-acting, the water being supplied from a reservoir to the wetting rollers like ink from a fountain, and these rollers are also driven in the same way as the form rollers. This damping apparatus has the great advantage that the quantity of water can be regulated while the press is working, which gives the pressman the greatest facility for damping the stone properly.

The feed-board is furnished with adjustable guides and an improved pointing apparatus, and the register obtained is perfect.

A special feature of this machine is the patent delivery cylinder, which takes the sheets from the impression cylinder and transfers them to the self-acting sheet flyer with perfect certainty.

Each machine is arranged to run the bed once, twice, or three times to each impression, as may be desired; thus giving a distribution proportionate to the quality of the work. It will also roll any number of times without an impression while "inking up," to avoid running through waste sheets. Each machine is furnished with two sets of rollers—one for black and one for colored work.

Lithographic Power Presses, continued. Sizes and Prices.

No.	Size of stone.	Size of design.	Rollers covering form.	Price.	No.	Size of stone.	Size of design.	Rollers covering form.	Price.
1	21 × 26 in.	19 × 24 in.	4	\$4,300	4	32 × 46 in.	30 × 44 in.	6	\$6,400
2	24 × 32 in.	22 × 30 in.	6	4,900	5	36 × 52 in.	34 × 50 in.	6	7,200
3	28 × 40 in.	26 × 38 in.	6	5,600					

The prices include boxing and shipping, or putting up in New-York; also, apparatus to roll twice, two sets of rollers, counter-shaft, hangers, driving pulley, and two cone pulleys, go with each machine.

Dimensions, Weight, Speed, and Power.

No.	Over all.			Weight boxed, including steam fixtures.	Speed.	Horse power.
	Length.	Width.	Height.			
1	13 ft. 5 in.	7 ft. 2 in.	5 ft. 5 in.	About 5 tons.	611 to 1100	$\frac{1}{2}$
2	15 ft.	7 ft. 7 in.	6 ft.	About 7½ tons.	562 to 1000	$\frac{5}{8}$
3	16 ft.	9 ft. 10 in.	7 ft.	About 9½ tons.	506 to 900	$\frac{3}{4}$
3½	16 ft. 5 in.	10 ft.	7 ft.	About 10 tons.	506 to 900	$\frac{7}{8}$
4	18 ft.	10 ft. 6 in.	7 ft. 8 in.	About 12½ tons.	512 to 1800	1

PRICES OF MOLLETON CLOTH, ETC.

Best quality molleton for lithographers' rollers, 30 inches wide . .	\$1.50
Best quality molleton for lithographers' rollers, 60 inches wide . .	2.25
Mole-skin, 29 inches wide	1.25
Thick flannel, 30 inches wide	4.00
Thick flannel, 60 inches wide	7.25

LITHOGRAPHERS' AXIOMS.

To get high speed, use soft and easily distributed ink.

To get fine, sharp lines, and clean tints, use stiff or strong ink, necessarily at some sacrifice of speed.

A strong ink does not require a full dampening of the stone.

A soft or weak ink permits a free dampening of the stone.

Slow and heavy rolling tends to deposit ink on the stone.

Quick and light rolling tends to take off the stone the ink already on.

The finest prints are taken from soft and calendered paper.

Hand-made or laid dry writing papers are not suitable for lithographic work.

Soft paper absorbs water and ink; hard paper resists both.

Never touch the face of a stone with a warm or sweating finger.

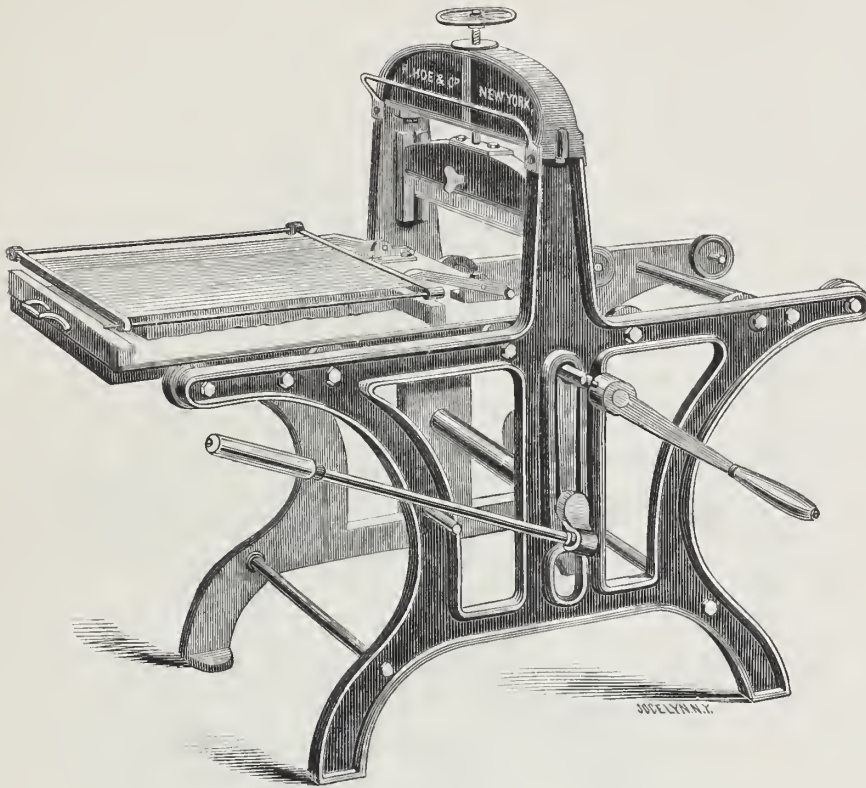
Keep the machine clean, not on outside only, but in all its working parts.

See that rust does not form on iron work exposed to moisture.

See that every working part is fairly supplied with oil.

Constantly wipe up all overrunning oil.

Sperm oil is the best lubricator. If, after a while, it gums, add a little paraffine.



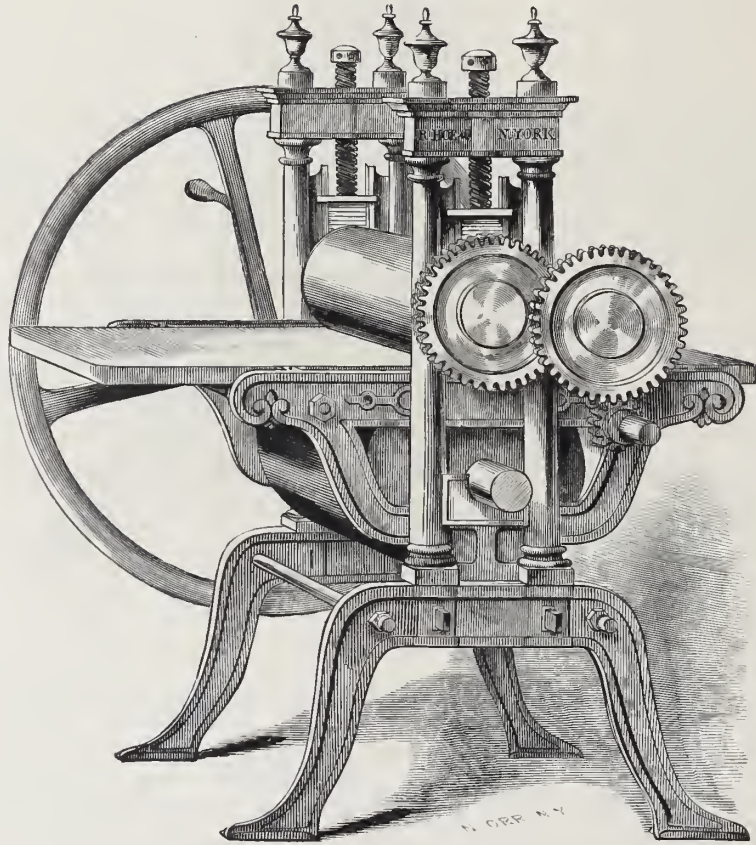
HAND LITHOGRAPHIC PRESS.

It is made of the best materials, is strong, simple, convenient, and works with great ease. The roller under the bed is geared in presses of large size, but is so arranged that it may be used with or without the gearing. The bed is made sufficiently long always to cover the roller, thus protecting it from dirt or grease from the scraper, and at the same time giving it a more even movement. The toggles are adjustable so as to vary the elevation of the bed from one-eighth inch to five-eighths inch, as may be desired, thus permitting the use of any kind of pointing apparatus.

Dimensions and Prices.

No.	Size of stone.	Size of design.	Price.	No.	Size of stone.	Size of design.	Price.
1	21 × 26 in.	19 × 24 in.	\$175.00	4	32 × 46 in.	30 × 44 in.	\$335.00
2	24 × 32 in.	22 × 30 in.	215.00	5	36 × 52 in.	34 × 50 in.	400.00
3	28 × 40 in.	26 × 38 in.	280.00	6	40 × 60 in.	38 × 58 in.	485.00

A deduction is made for the tympan and frame, when not required.

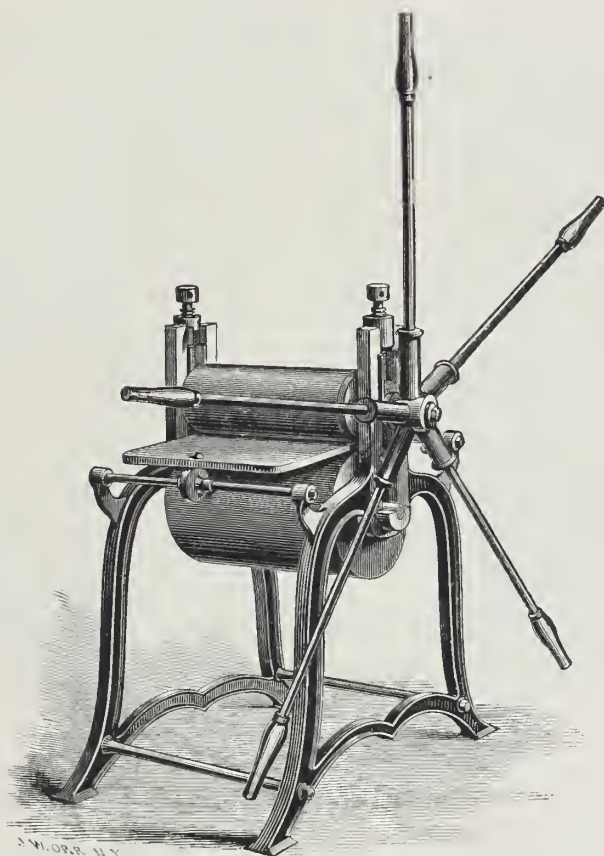


GEARED COPPER-PLATE PRESS.

This is a heavy and powerful machine, capable of printing the largest plates. The frame is strengthened by internal wrought-iron tension rods. The gearing is double, and the bed is guided by side anti-friction rollers. It may be worked by hand or run by steam power.

Dimensions and Prices.

Bed 34×60 inches. | Price \$675.00



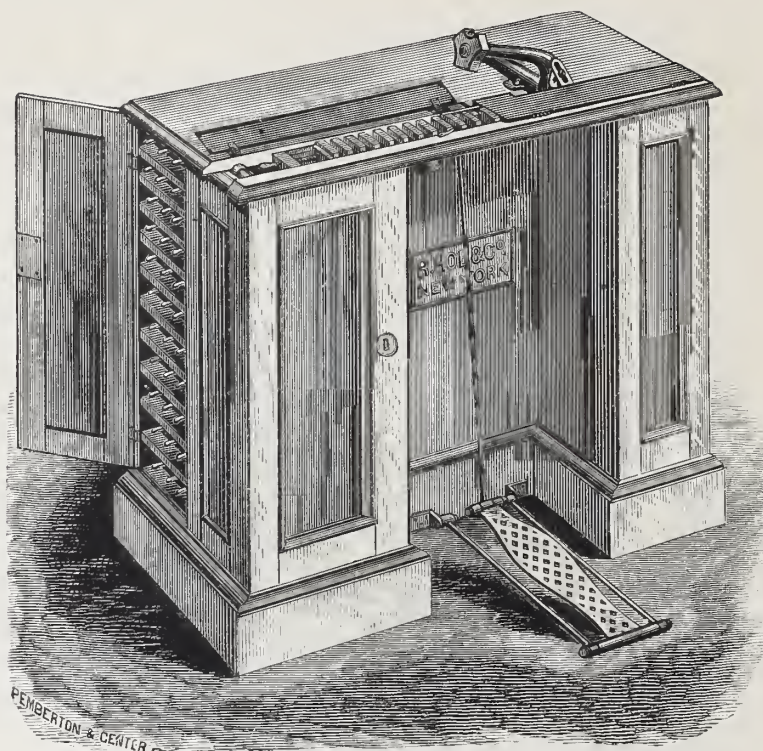
IRON COPPER-PLATE PRESS.

The side-frames, cylinders, and bed are made of cast-iron; the cylinders are turned and the bed planed perfectly true. The shafts through the cylinders, the braces, arms, and screws are of wrought iron; the bearings of composition.

Every material connected with copper-plate printing supplied.

Dimensions and Prices.

Width of bed.	Price.	Width of bed.	Price.
10 inches	\$175.00	24 inches	\$300.00
12 inches	200.00	26 inches	325.00
15 inches	225.00	28 inches	350.00
18 inches	250.00	30 inches	375.00
21 inches	275.00		



Black-Walnut Cabinet.

PATENT NEWSPAPER ADDRESSING MACHINE.

This machine prints with ink on paper or wrappers at the rate, including all necessary stoppages, of about fifteen hundred per hour. It may be run at a much higher speed without injury.

Price, with black-walnut cabinet, and four patent lined galleys, boxed, \$80.

Price, with cast-iron frame and black-walnut top, and four patent lined galleys, boxed, \$65.

ADDRESSING MACHINE GALLEYS.

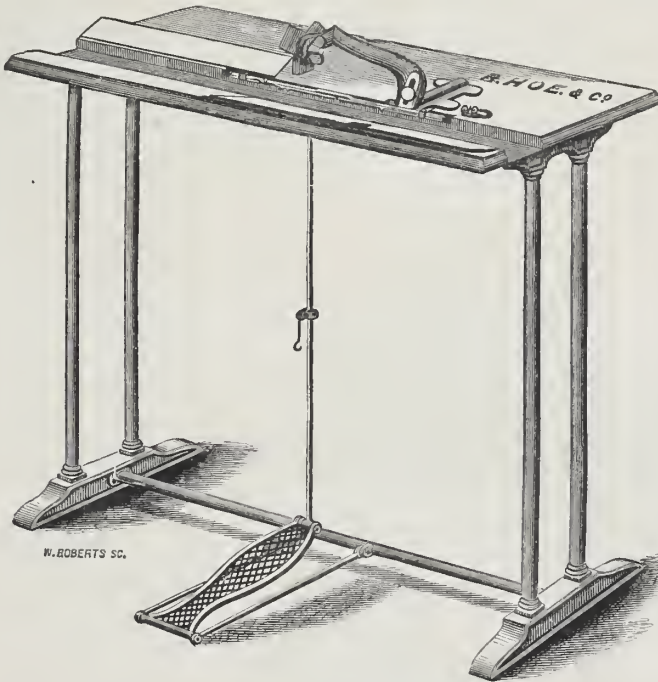
Size inside.	Each.
$1\frac{1}{2} \times 30$ inches, patent lined, with brass bottom,	\$1.50
$1\frac{1}{2} \times 30$ inches, unlined, with brass bottom . . .	.75
$1\frac{1}{2} \times 30$ inches, unlined, with zinc bottom . . .	.60
Mailing type, with abbreviations, per lb.,	40 cents.
Bell reglets, per hundred,	50 cents.

DIRECTIONS FOR WORKING. Classify the addresses by putting all that take two lines in galleys by themselves, as also those of three and four lines. If it should be required to have a two-line address in a three-line galley, put in an extra reglet, so that it shall occupy the same space as the three-line address. In each set of galleys the addresses should follow in the geographical order of the States, thus: *Maine, New Hampshire, Vermont, Massachusetts, etc.*;

or, if preferred, in alphabetical order. In each State, post-office addresses should follow in alphabetical order, and in each post-office district the subscribers' names should be alphabetically arranged. Number the galleys from *one* upward in the above order, leaving space in each for future additions; take proofs from all the galleys and paste them in numerical order in a mail-book, so that any address can be quickly found or alterations made.

As it is desirable that the addresses should be conspicuous, the machine and galleys are arranged to take in addresses of from two to four lines each of pica type, with a pica space reglet between each address, though any type, from brevier to pica, may be used.

In filling the galleys, bring the first line of each address up to the side of the galley, as it is by this the feeding pawl pushes the galley along when printing. In arranging the addresses in the galleys, commence with a post-



Cast-Iron Frame.

office address and put a pica bell reglet between it and the next address, and a pica space reglet between each of the following addresses until the next post-office is reached, and so on.

When filling galleys with addresses, each complete within itself, thus:

*R. Hoe & Co.
Tudor Street,
London, Eng.*

it is not necessary to put in bell reglets to indicate the change of post-office.

The space and bell reglets should be of wood, as it is desirable to have the galleys as light as possible, so that they will move along easily when printing. Lock them up as tight as they will bear without springing, and handle them carefully when filled, so as not to bend them.

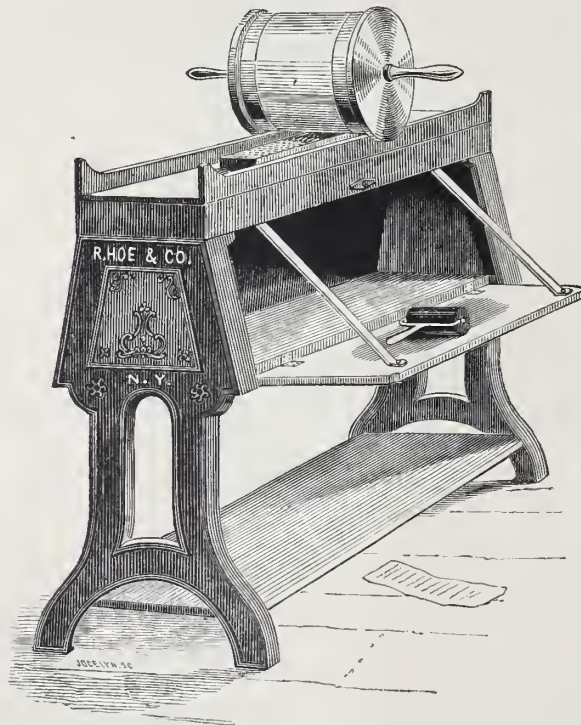
When the galleys are properly filled and ready to print from, apply the ink and enter a galley foot foremost into the groove of the left-hand end of the machine, and push it forward by the treadle until an address comes under the opening between the shields. Adjust the bolt in the slot of the hammer arm so that the sliding pawl will just bring forward another address at each stroke of the treadle. Set the sliding shield so as to leave only the address exposed, turn down the hammer face that corresponds to the width of the address, and print all the galleys of that set, if convenient, before changing to another set.

When five or more papers are sent to the same post-office, they are usually put in wrappers, containing from five to fifteen each. In printing these, the machine begins at the foot of the galley, and the addresses are successively printed on the papers until the projecting nib on the bell reglets, which extends over the opposite side of the galley, strikes the bell lever in passing it and rings the bell, which indicates that the next is the post-office address of this list. This may be printed on a wrapper sufficiently large to inclose from five to fifteen papers, or it may be printed on a small piece of paper that is laid

away with the papers to designate them. A good plan is to print these addresses in advance on narrow slips, that are afterward put around each paper, and to lay these slips away inside of their respective printed wrappers until required. In this way, all the printing can be done in advance of the day of publication. All addresses should consist of at least two lines, thus:

*R. Hoe & Co.
Chicago, Ill.*

even those that are put up in packages; then, if a package should accidentally be broken open, the papers would still reach their destination.



NEWSPAPER PROOF PRESS.

This machine has a strong cast-iron frame. A roller brayer is sent with each. Size of bed, $9\frac{1}{2} \times 39$ inches. Price, \$60. Boxing and shipping, \$3.50.



JOB PROOF PRESS.

Iron bed and roller, without stand.

No.	Size in inches.	Price.	Boxing and shipping.
1 . .	9 × 27	\$20.00	\$1.00
2 . .	12 × 27	25.00	1.50
3 . .	16 × 30	30.00	2.00
4 . .	20 × 36	45.00	2.50
5 . .	30 × 62	65.00	4.00

The price with stand includes roller brayer.

All our proof presses are of right height to prove matter in galleys.

Complete, with hard wood stand.

No.	Size in inches.	Price.	Boxing and shipping.
1 . .	9 × 27	\$28.00	\$2.50
2 . .	12 × 27	33.00	3.00
3 . .	16 × 30	40.00	3.50
4 . .	20 × 36	55.00	4.00
5 . .	30 × 62	80.00	6.00

PLAIN FRAME IMPOSING TABLES, WITH AMERICAN MARBLE TOPS.

Very substantial, with square legs and short drawers.

Single.

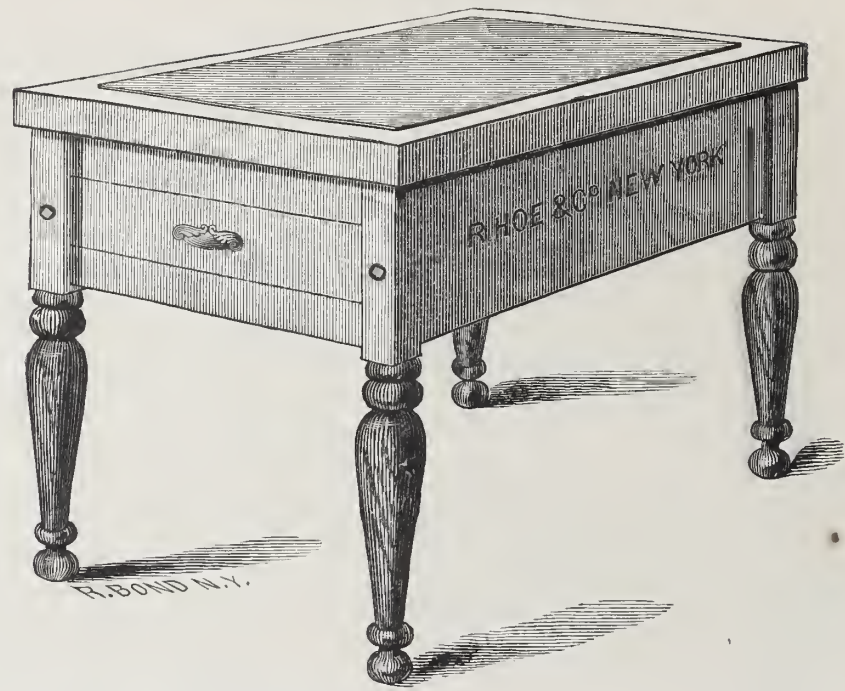
No.	Size in inches.	Price.
1	17 × 21	\$15.00
2	20 × 25	19.00
3	24 × 29	23.00
4	26 × 34	28.00
5	29 × 42	35.00
6	32 × 47	42.00
7	35 × 51	49.00

Double.

No.	Size in inches.	Price.
1	17 × 42	\$27.00
2	20 × 50	30.00
3	24 × 58	36.00
4	26 × 68	47.00
5	29 × 84	60.00
6	32 × 94	77.00
7	35 × 102	91.00

All our imposing tables can be taken to pieces, for convenience in packing and shipping.

The prices include boxing and shipping.



IRON AND ITALIAN MARBLE IMPOSING TABLES.

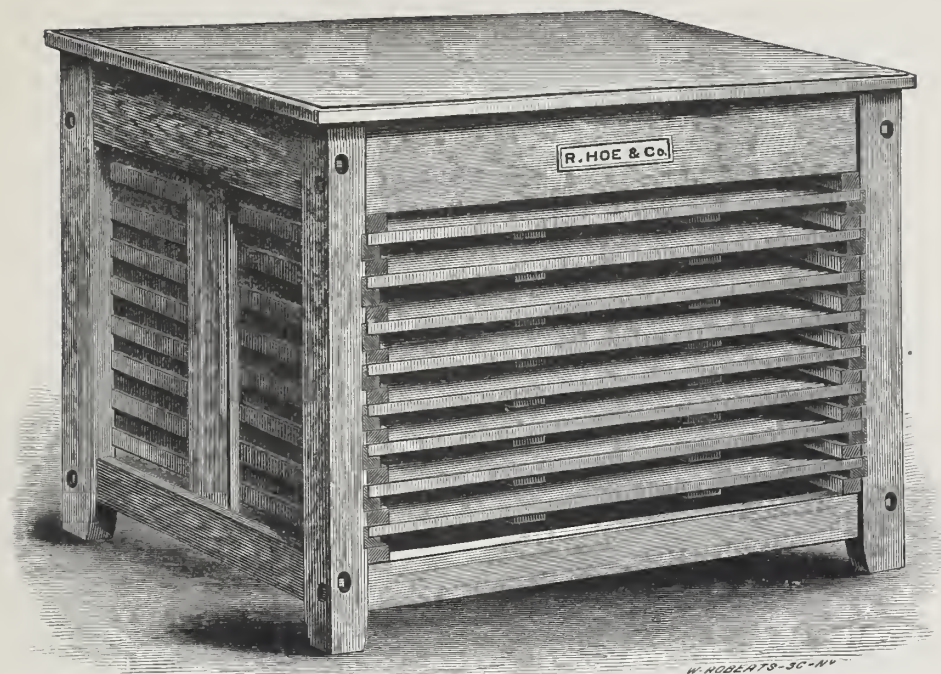
The frames are of hard wood, with neatly turned legs, and in every respect made in the best manner. The top is either Italian marble, as shown in the above cut, or iron with rabbeted edge, like the patent top shown on next page, as may be ordered.

Single.			Double.		
No.	Size in inches.	Price.	No.	Size in inches.	Price.
1	17 × 21	\$22.00	1	17 × 42	\$34.00
2	20 × 25	26.00	2	20 × 50	37.00
3	24 × 29	30.00	3	24 × 58	43.00
4	26 × 34	35.00	4	26 × 68	54.00
5	29 × 42	42.00	5	29 × 84	67.00
6	32 × 47	49.00	6	32 × 94	84.00
7	35 × 51	56.00	7	35 × 102	98.00

WETTING BOARDS.

	Inches.	Common.		Iron bound.
Demy	17 × 22	\$1.00	Improved double thickness .	\$2.00
Medium	19 × 24	1.10	Improved double thickness .	2.20
Royal	23 × 27	1.25	Improved double thickness .	2.50
Super Royal . . .	24 × 30	1.40	Improved double thickness .	2.80
Imperial	27 × 36	1.60	Improved double thickness .	3.20
Double Medium . .	28 × 40	1.75	Improved double thickness .	3.50

Tint boards of the best seasoned soft pine, and manufactured expressly for the trade, 27½ × 39½ inches, each, \$1.60.



IRON IMPOSING TABLES, WITH LETTER BOARDS.

(Patented February 22, 1876.)

This patent iron imposing table has its edges rabbeted all around, as shown in cut, forming a convenient rest for the galley in emptying. The frame is of hard wood, very heavy and substantial, and the boards, of similar material, are strongly battened so as to support any form of type. The price includes boxing and eight letter boards.

No.	Size of bed, inches.	Size of boards, inches.	Price.	No.	Size of bed, inches.	Size of boards, inches.	Price.
1 . . .	17×21	14×15	\$40.00	5 . . .	29×42	26×36	\$80.00
2 . . .	20×25	17×19	45.00	6 . . .	32×47	29×41	100.00
3 . . .	24×29	21×22	50.00	7 . . .	35×51	32×45	125.00
4 . . .	26×34	23×27	60.00				

Prices of letter boards, with two
battens on bottoms.

	Inches.	Pine.	Cherry.
Demy . . .	17×22	\$.80	\$1.00
Medium . .	19×24	.90	1.10
Royal . . .	23×27	1.10	1.30
Super Royal .	24×30	1.40	1.60
Imperial . .	27×36	1.65	2.15
Double Medium	28×40	1.75	2.25

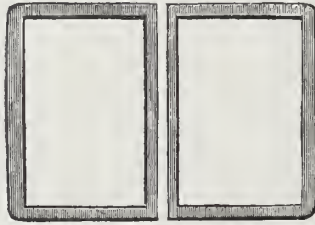
Prices of letter boards, with two
battens and end clamps.

	Inches.	Pine.	Cherry.
Demy . . .	17×22	\$1.10	\$1.20
Medium . .	19×24	1.20	1.40
Royal . . .	23×27	1.35	1.65
Super Royal .	24×30	1.75	2.10
Imperial . .	27×36	2.00	2.35
Double Medium	28×40	2.25	2.60



WROUGHT-IRON CHASES.

These are made of the best iron and are warranted square and true.



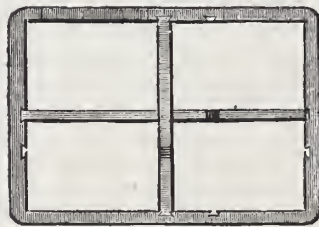
PAIR OF HALF CHASES.

No.	Pair, overall, inches.	Size each inside, inches.	Price per pair.
1 . .	17 × 21	15 × 8 $\frac{3}{4}$	\$10.00
2 . .	20 × 25	18 × 10 $\frac{3}{4}$	11.00
3 . .	24 × 29	22 × 12 $\frac{3}{4}$	12.00
4 . .	26 × 34	23 $\frac{3}{4}$ × 15	13.00
5 . .	29 × 42	26 $\frac{1}{2}$ × 18 $\frac{7}{8}$	14.00
6 . .	32 × 47	29 $\frac{1}{2}$ × 21 $\frac{3}{8}$	15.50
7 . .	35 × 51	32 × 23	17.00
8 . .	38 × 55	35 × 25	18.50
9 . .	41 × 60	38 × 27 $\frac{1}{2}$	20.00



PAIR OF HALF CHASES WITH BARS.

No.	Pair, over all, inches.	Size each inside, inches.	Price per pair.
1 . .	17 × 21	15 × 8 $\frac{3}{4}$	\$13.50
2 . .	20 × 25	18 × 10 $\frac{3}{4}$	14.50
3 . .	24 × 29	22 × 12 $\frac{3}{4}$	15.50
4 . .	26 × 34	23 $\frac{3}{4}$ × 15	16.50
5 . .	29 × 42	26 $\frac{1}{2}$ × 18 $\frac{7}{8}$	17.50
6 . .	32 × 47	29 $\frac{1}{2}$ × 21 $\frac{3}{8}$	19.00
7 . .	35 × 51	32 × 23	20.50
8 . .	38 × 55	35 × 25	22.00
9 . .	41 × 60	38 × 27 $\frac{1}{2}$	23.50



BOOK OR SHIFTING-BAR CHASE.

No.	Size over all, inches.	Size inside, inches.	Price each.
1 . .	17 × 21	15 × 19	\$8.00
2 . .	20 × 25	18 × 23	8.50
3 . .	24 × 29	22 × 27	9.00
4 . .	26 × 34	23 $\frac{3}{4}$ × 31 $\frac{3}{4}$	9.50
5 . .	29 × 42	26 $\frac{1}{2}$ × 39 $\frac{1}{2}$	10.00
6 . .	32 × 47	29 $\frac{1}{2}$ × 44 $\frac{1}{2}$	11.00
7 . .	35 × 51	32 × 48	12.00
8 . .	38 × 55	35 × 52	13.00
9 . .	41 × 60	38 × 57	14.00



SKELETON CHASE.

No.	Size over all, inches.	Size inside, inches.	Price each.
1 . .	17 × 21	15 × 19	\$5.00
2 . .	20 × 25	18 × 23	5.50
3 . .	24 × 29	22 × 27	6.00
4 . .	26 × 34	23 $\frac{3}{4}$ × 31 $\frac{3}{4}$	6.50
5 . .	29 × 42	26 $\frac{1}{2}$ × 39 $\frac{1}{2}$	7.50
6 . .	32 × 47	29 $\frac{1}{2}$ × 44 $\frac{1}{2}$	8.00
7 . .	35 × 51	32 × 48	9.00
8 . .	38 × 55	35 × 52	10.00
9 . .	41 × 60	38 × 57	11.00



NEWS CHASE.

No.	Size over all, inches.	Size inside, inches.	Price each.
1 . .	17 × 21	15 × 19	\$5.00
2 . .	20 × 25	18 × 23	6.00
3 . .	24 × 29	22 × 27	7.00
4 . .	26 × 34	23 $\frac{3}{4}$ × 31 $\frac{3}{4}$	8.00
5 . .	29 × 42	26 $\frac{1}{2}$ × 39 $\frac{1}{2}$	9.00
6 . .	32 × 47	29 $\frac{1}{2}$ × 44 $\frac{1}{2}$	10.00
7 . .	35 × 51	32 × 48	11.00
8 . .	38 × 55	35 × 52	12.00
9 . .	41 × 60	38 × 57	13.00

The regular chases, from No. 1 to 3, are made of $1 \times \frac{5}{8}$ in. iron; from No. 4 to 6, of $1\frac{1}{8} \times \frac{5}{8}$ in. iron; and from No. 7 to 9, of $1\frac{1}{4} \times \frac{5}{8}$ in. iron. If unusual strength is required, there will be an additional charge.

IRON SIDE AND FOOT STICKS.

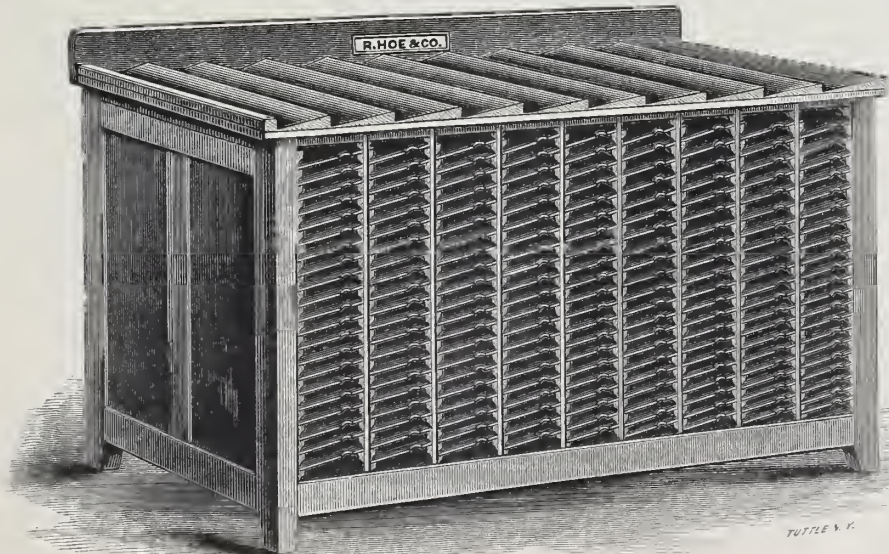
Iron side and foot sticks, 5 cents per inch in length. They are made, unless otherwise ordered, $1\frac{1}{2}$ inch shorter than the inside measurement of the chase with which they are to go.

CAST-IRON FORM TRUCK.

Cast-iron form truck, \$3.00.

CAST-IRON CHASES.

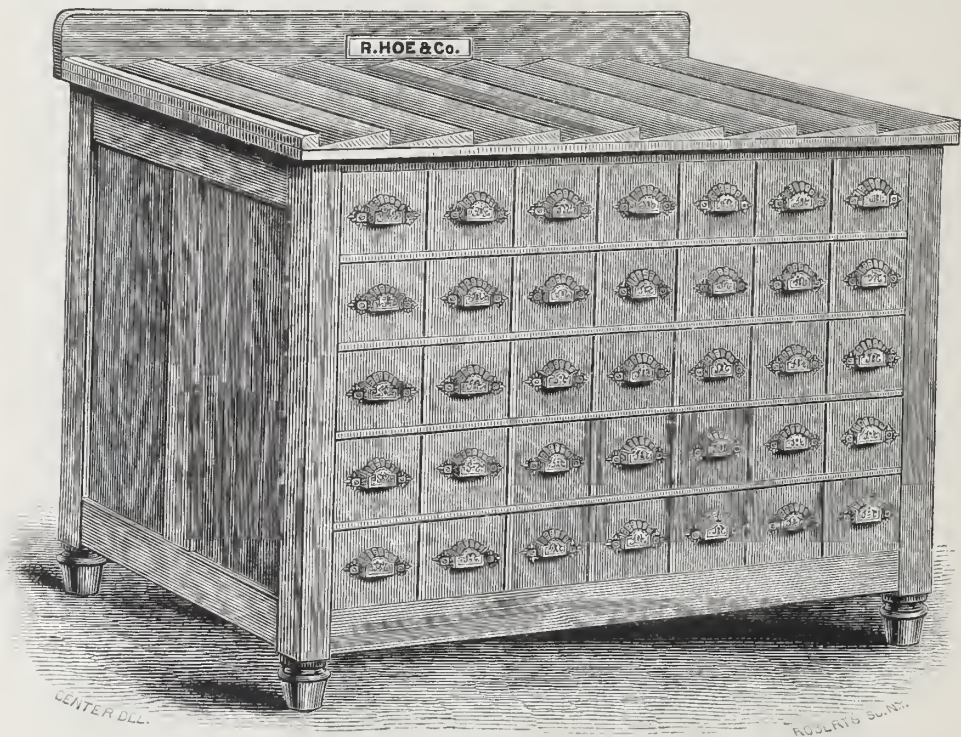
Size inside.	Price each.	Size inside.	Price each.	Size inside.	Price each.	Size inside.	Price each.	Size inside.	Price each.	Size inside.	Price each.
4 × 5	\$.28	6 × 12	\$.55	8 × 32	\$.80	10 × 18	\$.80	12 × 24	\$.90	16 × 20	\$1.15
4 × 24	.70	6 × 20	.70	8 × 40	1.30	10 × 22	.85	12 × 30	.95	16 × 28	1.15
5 × 7	.40	6 × 24	.70	9 × 12	.70	10 × 28	.90	13 × 28	.95	17 × 22	1.15
5 × 16	.55	6 × 30	.75	9 × 18	.80	10 × 31	.95	14 × 22	.90	18 × 24	1.15
5 × 28	.75	7 × 16	.70	9 × 25	.90	12 × 14	.75	14 × 26	.95	20 × 25	1.20
6 × 43	1.25	7 × 27	.75	9 × 31	1.00	12 × 17	.85	15 × 20	1.00	24 × 28	1.25
6 × 8	.40	8 × 21	.70	10 × 14	.75	12 × 20	.90	15 × 24	1.10	24 × 30	1.30



GALLEY CABINET. (FULL SIZE.)

The full-size cabinet, made as shown in cut, will hold 198 single-column galleys, which may be kept in order by numbering each rack to correspond with proof slip. Each galley must be locked up before putting in place.

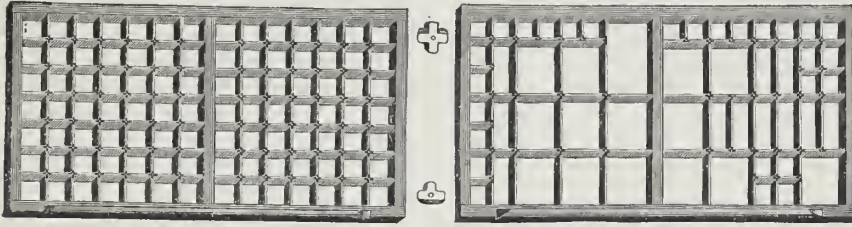
	Cherry.	Pine.	Boxing and shipping.
Nine columns wide, holding 198 single-column galleys	\$100.00	\$90.00	\$4.00
Six columns wide, holding 132 single-column galleys .	72.00	62.00	3.00
Three columns wide, holding 66 single-column galleys .	40.00	30.00	2.00



CABINET WITH "SORT" DRAWERS AND GALLEY TOP.

Made entirely of hard wood or pine. The drawers are divided into three compartments, each holding 25 lbs. The top is arranged for single galleys, unless otherwise ordered.

Price, with	Arranged in	Pine.	Cherry.	Boxing and shipping.
10 drawers . . .	2 tiers . . .	\$25.00 . . .	\$30.00 . . .	\$1.00
15 " . . .	3 " . . .	40.00 . . .	45.00 . . .	1.50
20 " . . .	4 " . . .	50.00 . . .	55.00 . . .	2.00
25 " . . .	5 " . . .	70.00 . . .	75.00 . . .	2.50
30 " . . .	6 " . . .	90.00 . . .	95.00 . . .	3.00
35 " . . .	7 " . . .	100.00 . . .	105.00 . . .	4.00



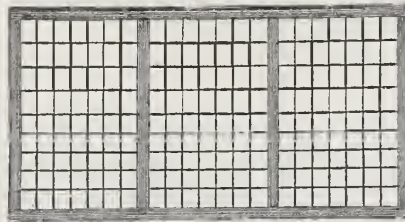
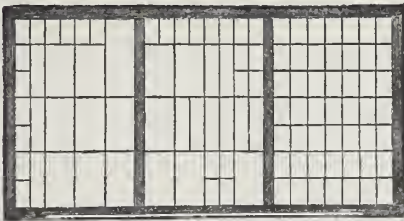
TYPE CASES.

(Patented May 2, 1871.)

These patent type cases are of unusual strength, owing to the use of our patent brass clasp and long pin, which, being clinched to bottom of case, holds securely every partition. They are made in the very best manner, with hard wood frames and fillings.

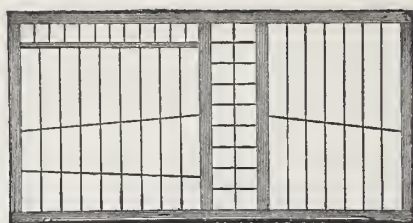
PAIR CASES.

	Per Pair.		Per Pair.
Full size, with patent clasps . . .	\$1.75	Full size, without clasps . . .	\$1.60
Two-third size, patent clasps . . .	1.50	Two-third size, without clasps . . .	1.40
Rooker, with patent clasps . . .	1.75	Rooker, without clasps . . .	1.60
German, with patent clasps . . .	1.75	German, without clasps . . .	1.60
Music, with patent clasps . . .	3.75	Music, without clasps . . .	3.50
Greek, with patent clasps . . .	3.75	Greek, without clasps . . .	3.50
Half cap, patent clasps, each . . .	.60	Half cap, without clasps, each . . .	.50



JOB CASE AND TRIPLE CASE.

	Each.		Each.
Full size, patent clasps	\$1.00	without clasps \$	.90
Three-fourths, patent clasps . . . . .	.90	without clasps	.80
Job or Yankee combination, two-thirds, patent clasps . . . . .	.80	without clasps	.75
TRIPLE, with patent clasps	1.00	without clasps	.90



RULE CASE.



SLUG CASE.

Rule case, with patent clasps .	\$1.25	Lead case	\$1.00
Rule case, without clasps . .	1.15	Slug case	1.00
Blank case	\$.65		

Our galley patents, which have been sustained by the Circuit Court of the United States, give us the sole right to make galleys with linings attached in such a manner as to leave their surfaces unbroken by screws or other fastenings.

COMMON PROOF GALLEY.

	Inches inside.	Single.	Inches inside.	Double.
With wood rim, brass bottom	$3\frac{3}{4} \times 23\frac{1}{4}$	\$1.25	$6\frac{1}{2} \times 23\frac{1}{4}$	\$1.50
With linings screwed on and brass bottom	$3\frac{3}{4} \times 23\frac{1}{4}$	1.75	$6\frac{1}{2} \times 23\frac{1}{4}$	2.00
Extra single-column	$5 \times 23\frac{1}{4}$	2.00		
Solid cast-brass	$3\frac{3}{4} \times 23\frac{1}{4}$	8.00	$6\frac{1}{2} \times 23\frac{1}{4}$	10.00
All wood	$3\frac{3}{4} \times 23\frac{1}{4}$	0.75	$6\frac{1}{2} \times 23\frac{1}{4}$	1.00



	Inches inside.	Half- lined.	Full- lined.
Single-column	$3\frac{3}{4} \times 23\frac{1}{4}$	\$1.75	\$2.00
Extra single-column	$5 \times 23\frac{1}{4}$	2.00	2.25
Amateur single-col.	$3\frac{3}{4} \times 12$	.75	1.00
Double-column	$6\frac{1}{2} \times 23\frac{1}{4}$	2.25	2.50

PATENT LINED GALLEY.

The rim is of wood, faced with brass, as shown in section, thus making a smooth surface for type to rest against.

	Inches inside.	Price.
Single-column	$3\frac{3}{4} \times 23\frac{1}{4}$	\$2.50
Double-column	$6\frac{1}{2} \times 23\frac{1}{4}$	3.00



PATENT TUBE-RIM GALLEY.

The brass tubular rim is filled with wood, as shown in the section, and the corners are bent. The entire surface is brass, and may be immersed in water without injury, as the wooden core is hermetically sealed.



	Inches inside.	Price.
Single-column . .	$3\frac{3}{4} \times 23\frac{1}{4}$	\$2.75
Double-column . .	$6\frac{1}{2} \times 23\frac{1}{4}$	3.25

ANGLE-RIM GALLEY.

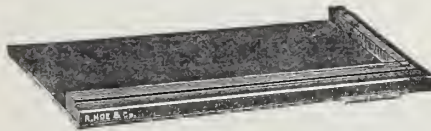
All brass, with bent corners, and as light as either of the above. For strength and durability unsurpassed.

	Inches inside.	Price.
Single-column . .	$3\frac{3}{4} \times 23\frac{1}{4}$	\$3.50
Double-column . .	$6\frac{1}{2} \times 23\frac{1}{4}$	4.50



PATENT LINED LOCK-UP GALLEY.

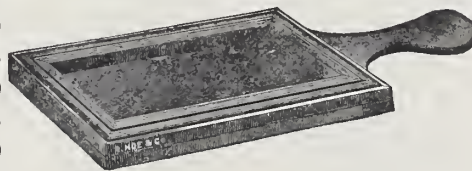
The types are held securely by a brass clamp, worked by a steel pinion and ratchet.



Inches inside.	Full rims.	Half rims.
5×15	\$.40	\$.30
$5\frac{1}{2} \times 18$ . . . . .	.50	.40
6×20 . . . . .	.60	.50
7×22 . . . . .	.65	.55
8×24 . . . . .	.70	.60

COMMON ALL-WOOD GALLEY.

	Inches inside.	All wood.	With brass slice and pat. lining.
Octavo	6×10	\$2.00	\$4.00
Quarto	$8\frac{3}{8} \times 13$	2.25	4.75
Medium	10×16	2.50	5.50
Royal	12×18	2.75	6.25
Sup. Royal	14×21	3.50	7.00
Imperial	15×22	4.00	8.00
Republican	18×25	4.50	10.00



SLICE GALLEY.

ADDRESSING MACHINE GALLEYS.

Inches inside.		Price.
$1\frac{1}{2} \times 30$. .	Patent lined, with brass bottom	\$1.50
$1\frac{1}{2} \times 30$. .	Unlined, with brass bottom . . . . .	.75
$1\frac{1}{2} \times 30$. .	Unlined, with zinc bottom . . . . .	.60

MAILING GALLEYS.

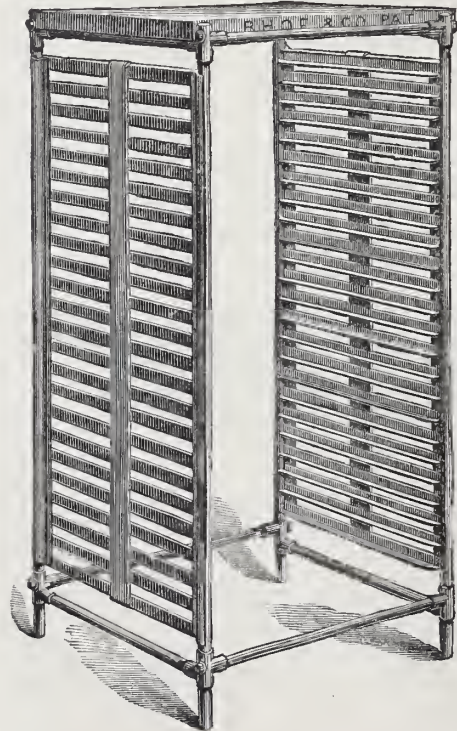
Closed at both ends, wide enough for four or five columns names, about \$3.50
Brass reglets for same, nonpareil thickness35

JOB GALLEY, WITH BRASS BOTTOM.

	Inches inside.	Patent lined.	Wood rim.		Inches inside.	Patent lined.	Wood rim.
Octavo	6 × 10	\$2.00	\$1.00	Royal	12 × 18	\$3.50	\$1.75
Quarto	8 ³ / ₈ × 13	2.50	1.25	Super Royal	14 × 21	4.00	2.00
Foolscap	9 × 14	2.75	1.35	Imperial	15 × 22	4.50	2.25
Medium	10 × 16	3.00	1.50	Republican	18 × 25	5.00	2.50

WOOD CASE STANDS.

- | No. | | Price. |
|-----|---------------------------------------------------------------------------------------------------------------|--------|
| 1. | Single stand, without racks | \$3.75 |
| 2. | Single stand, with racks for eight cases | 4.00 |
| 3. | Single stand, with racks for eight cases and galley rest | 4.25 |
| 4. | Double stand, without racks | 4.25 |
| 5. | Double stand, with eight racks | 4.50 |
| 6. | Double stand, with eight racks and galley rest | 4.75 |
| 7. | Double stand, with eight racks and galley rest and racks | 6.25 |
| 8. | Double stand, with racks for eight full and eight two-third cases | 5.25 |
| 9. | Double stand, with galley rest, and racks for sixteen full cases | 6.25 |
| 10. | Double stand, with galley rest and galley rack, with racks for eight full and eight two-third cases | 8.25 |



CASE RACKS.

	Wrought iron.	Pine.
Single, to hold 10 cases	\$10.00	\$5.00
Single, to hold 12 cases	11.00	6.00
Single, to hold 16 cases	12.00	7.00
Single, to hold 20 cases	13.00	8.00
Single, to hold 24 cases	14.00	9.00
Single, to hold 30 cases	15.00	10.00
Double, to hold 40 cases	20.00	14.00
Double, to hold 60 cases	24.00	18.00

GALLEY RACKS.

WROUGHT-IRON-PIPE GALLEY RACK

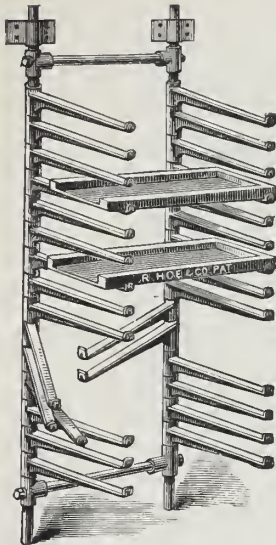
With cast-iron brackets and wrought-iron uprights.

To hold 10 galleys . . .	\$8.00
To hold 12 galleys . . .	9.00
To hold 15 galleys . . .	10.00
To hold 20 galleys . . .	12.00

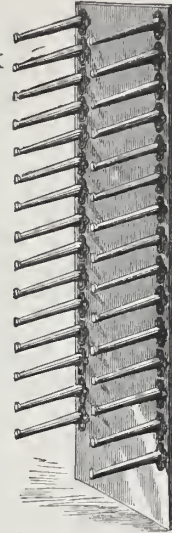
WOODEN GALLEY RACKS.

	All pine.	Wooden uprights with iron arms.
To hold 6 galleys	\$2.00	\$3.00
To hold 8 galleys	3.00	4.00
To hold 10 galleys	4.00	5.00
To hold 12 galleys	4.50	6.00
To hold 15 galleys	5.00	7.50
To hold 20 galleys	6.00	10.00

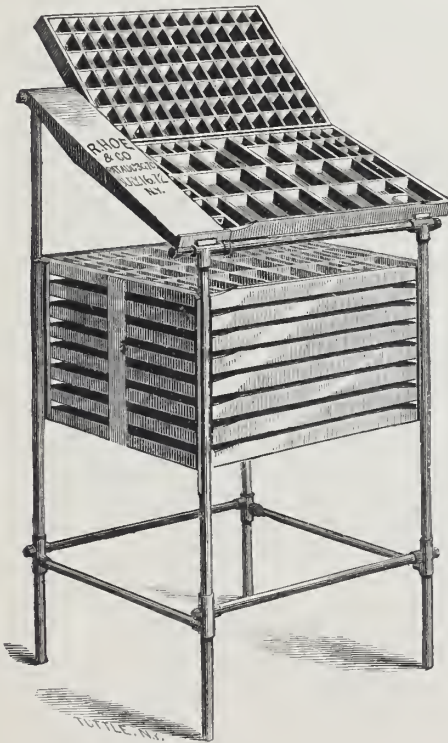
Iron arms, 40 cents per pair.



Galley rack with wrought-iron-pipe uprights and iron arms.



Galley rack with wooden upright and iron arms.



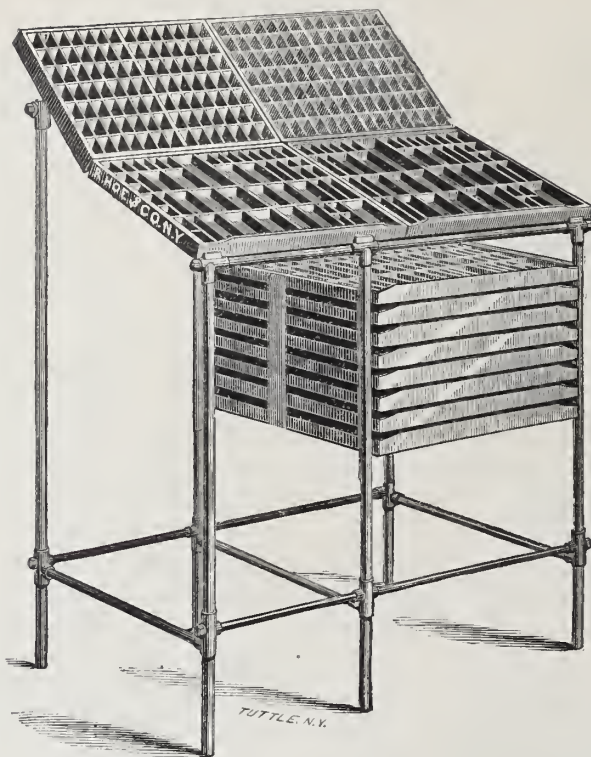
No. 3.

PATENT WROUGHT-IRON-PIPE STANDS.

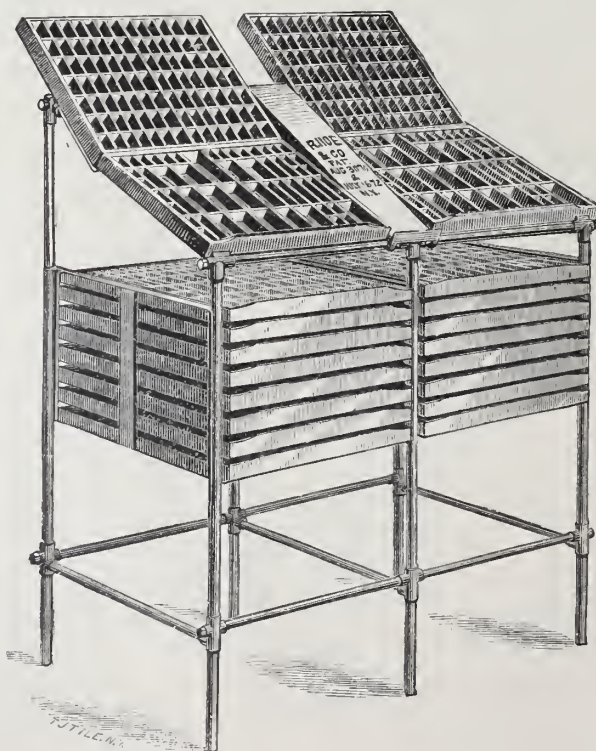
(Patented July 16, 1872, and August 13, 1875.)

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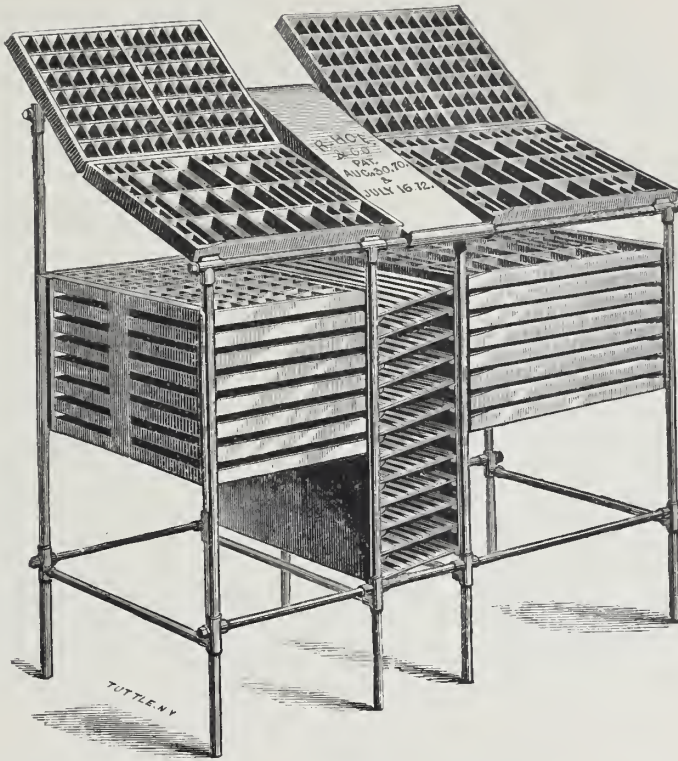
1. Single stand, without racks \$7.00
2. Single stand, with racks for eight cases 7.50
3. Single stand, with racks for eight cases and galley rest 9.50
4. Double stand, without racks 10.00
5. Double stand, with eight racks (see cut) 13.50
6. Double stand, with eight racks and galley rest . 16.75
7. Double stand, with eight racks, galley rest and racks 17.00
8. Double stand, with racks for eight full and eight two-third cases 18.00
9. Double stand, with galley rest and racks for sixteen full cases 20.00
10. Double stand, with galley rest and galley rack, with racks for eight full and eight two-third cases . 25.00
11. "Polhemus" double stand, with racks for sixteen full-size cases, galley rest and standing galley behind. The cases draw out behind or before, as desired 25.00



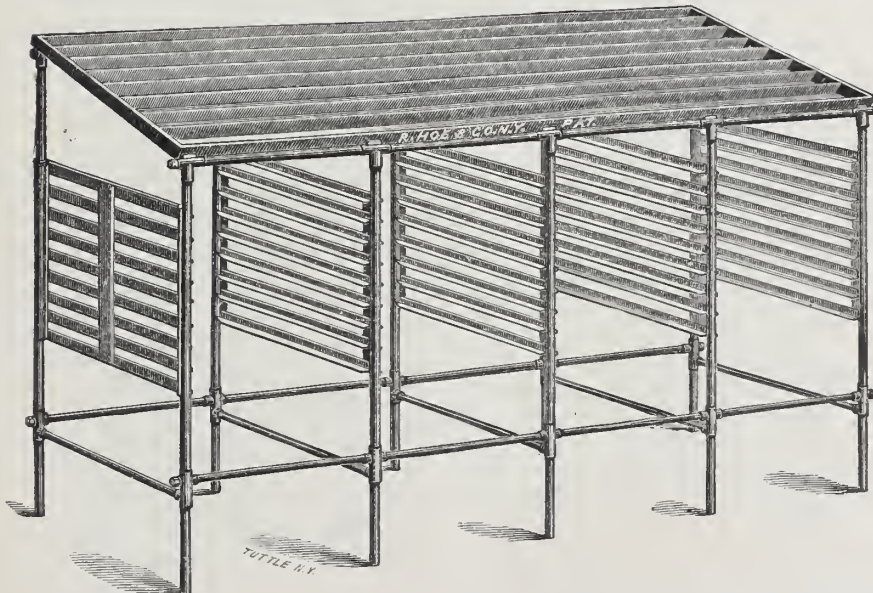
No. 5.



No. 9.



No. 10.



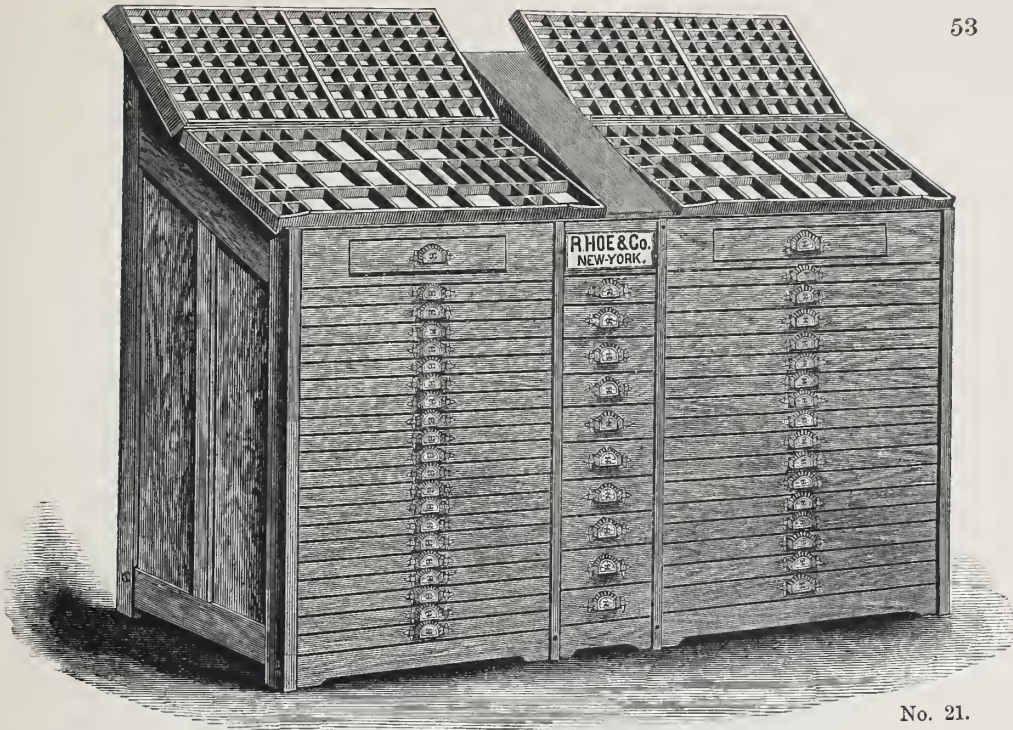
PATENT WROUGHT-IRON STANDING GALLEY, WITH
IRON RACKS AND ALL-BRASS TOP.

PRICES OF WROUGHT-IRON STANDING GALLEYS.

	Five Columns.	Six Columns.	Seven Columns.	Eight Columns.	Nine Columns.	Ten Columns.
1. Five feet long, with racks to hold eight two-third and eight full cases	\$60.00	\$65.00	\$70.00	\$75.00	\$80.00	\$85.00
2. Six feet long, with racks to hold eight two-third and eight full cases and galley rack	65.00	71.00	77.00	83.00	89.00	95.00
3. Seven feet long, with racks to hold sixteen full cases	70.00	77.00	84.00	91.00	98.00	105.00
4. Eight feet long, with racks to hold sixteen full cases and galley rack	75.00	83.00	91.00	99.00	107.00	115.00
5. Ten feet long, with racks to hold twenty-four full cases	80.00	90.00	100.00	110.00	120.00	130.00
6. Twelve feet long, with racks to hold thirty-two full cases	85.00	97.00	109.00	121.00	133.00	145.00

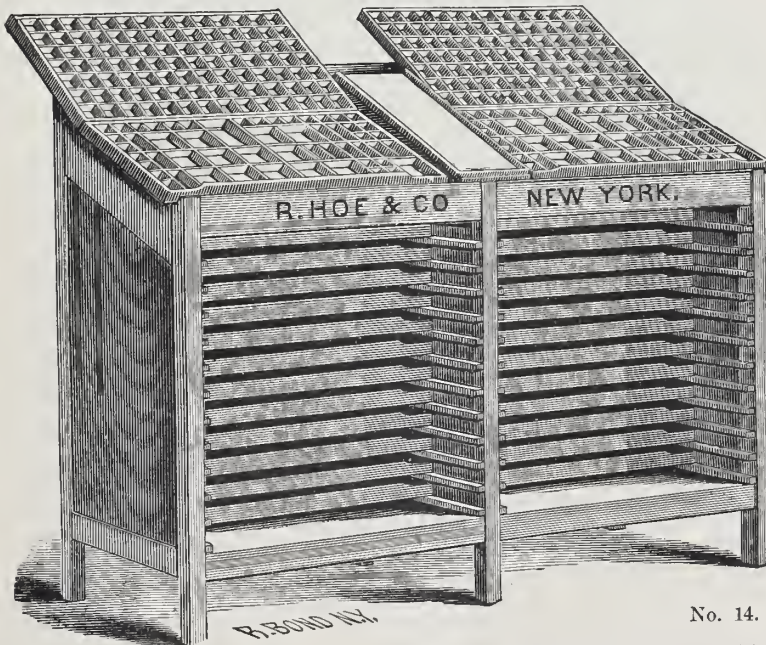
WOODEN STANDING GALLEYS, WITH HARD WOOD TOP AND RACKS.

	Five Columns.	Six Columns.	Seven Columns.	Eight Columns.	Nine Columns.	Ten Columns.
1. Five feet long, with racks to hold eight two-third and eight full cases . .	\$15.00	\$17.50	\$20.00	\$22.50	\$25.00	\$27.50
2. Six feet long, with racks to hold eight two-third and eight full cases and galley rack	19.00	23.00	26.00	29.00	32.00	35.00
3. Seven feet long, with racks to hold sixteen full cases	23.00	26.50	30.00	33.50	37.00	40.50
4. Eight feet long, with racks to hold sixteen full cases and galley rack	27.00	31.00	35.00	39.00	43.00	47.00
5. Ten feet long, with racks to hold twenty-four full cases	35.00	40.00	45.00	50.00	55.00	60.00
6. Twelve feet long, with racks to hold thirty-two full cases	43.00	49.00	55.00	61.00	67.00	73.00



No. 21.

FORTY-CASE COMBINATION CABINET.



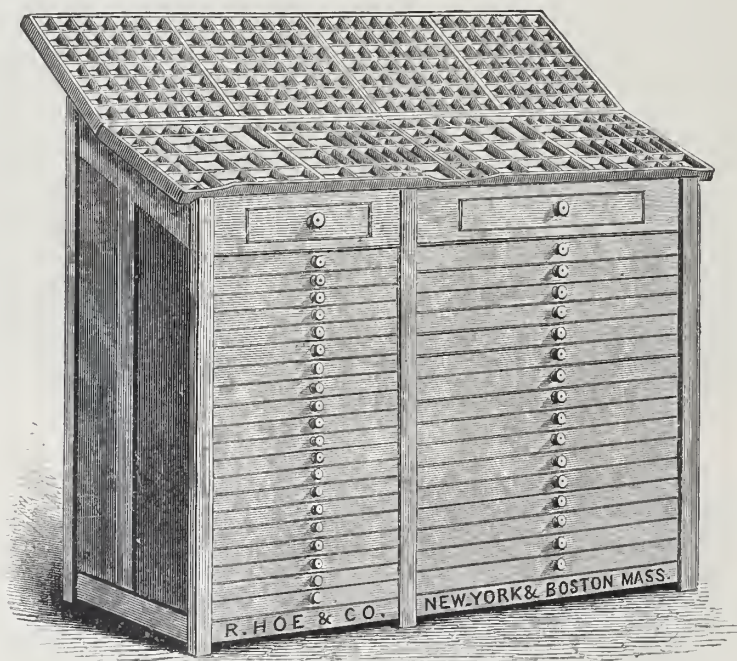
No. 14.

DOUBLE STAND AND CABINET FOR THIRTY CASES.

(Patented August 13, 1870.)

No.		Pine.	Cherry.	Walnut.	Boxing and shipping.
14	Patent double stand or cabinet, with galley rest—including 30 full cases	\$43.00	\$48.00	\$53.00	\$2.75
15	The same with galley racks	55.00	60.00	65.00	2.75

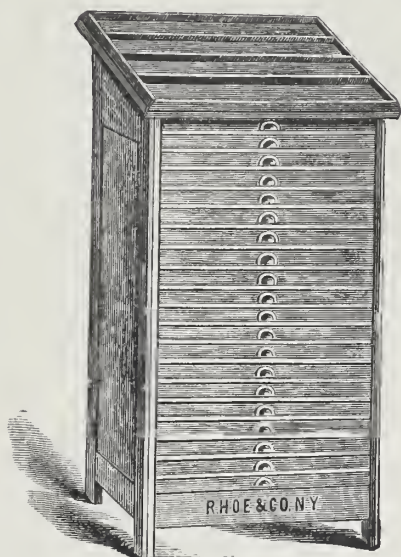
No.		Pine.	Cherry.	Walnut.	Boxing.
21	cabinet, 40 cases, "Combination," including 20 two-third, 8 full job, 8 triple, 10 drawers for sorts, 2 copy drawers, galley rest, and 2 pairs on top	\$85.00	\$90.00	\$95.00	\$3.25
Standing galleys are furnished with the cabinets, if preferred, to take the place of cases on top.					
Book-binders' and amateur cabinets made to order.					



No. 19.

FORTY-CASE "EAGLE" CABINET.

No.		Pine.	Cherry.	Walnut.	Boxing and shipping.
16	cabinet, 22 cases, with copy drawer, including 6 job, 4 triple, 4 two-third pairs, and 2 pairs on top	\$50.00	\$55.00	\$60.00	\$2.25
17	cabinet, 32 cases, with copy drawer, including 14 two-third cases, 6 full job, 4 triple, 2 pairs, and 2 pairs on top	60.00	65.00	70.00	2.25
18	cabinet, 36 cases, with 2 copy drawers, including 18 two-third cases, 7 full job, 3 triple, 2 pairs, and 2 pairs on top . . .	65.00	70.00	75.00	3.00
19	cabinet, "Eagle," 40 cases, with 2 drawers, including 20 three-quarter job, 8 full job, 8 triple, and 2 full pairs on top . .	70.00	75.00	80.00	3.25
20	cabinet, 42 cases, including 21 three-quarter job, 8 triple, 9 full job, and 2 pairs on top	75.00	80.00	85.00	3.25



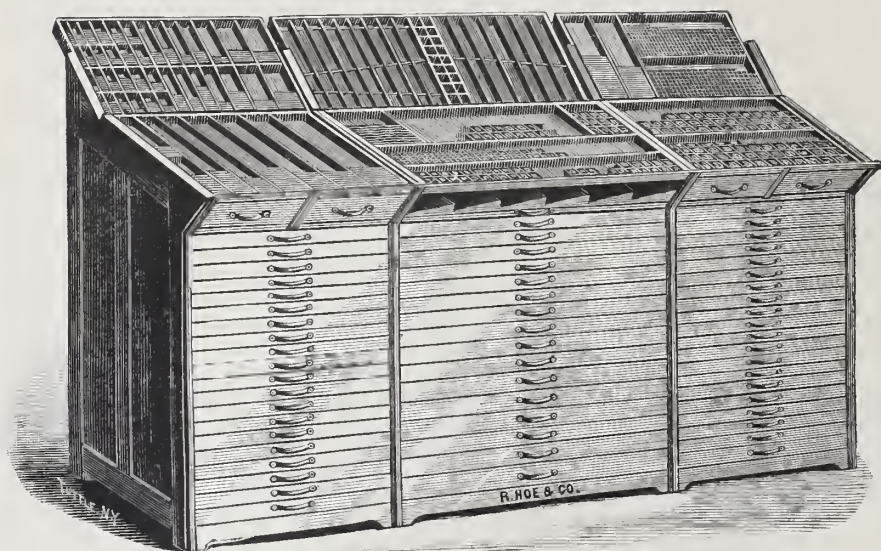
DUST-TIGHT CHERRY, PINE, AND WALNUT CABINETS.

No.	Containing	Pine.	Cherry.	Walnut.	Boxing and shipping.
1 . .	5 Half capital cases	\$6.50	\$8.50	\$11.00	\$.50
2 . .	10 " " "	12.00	14.00	16.00	.65
3 . .	15 " " "	16.50	18.50	20.50	1.00
4 . .	10 Two-third cases	15.00	17.00	19.00	.75
5 . .	12 " " "	17.00	19.00	21.00	1.00
6 . .	16 " " "	22.00	24.00	26.00	1.25
7 . .	20 " " "	30.00	32.00	34.00	1.50
8 . .	10 Three-quarter job cases	17.00	19.00	21.00	.75
9 . .	12 " " " "	19.00	21.00	23.00	1.00
10 . .	16 " " " "	25.00	27.00	29.00	1.25
11 . .	20 " " " "	31.00	33.00	35.00	1.50
12 . .	16 Full cases	27.00	29.00	31.00	1.50
13 . .	20 " "	32.00	34.00	36.00	1.75

Above prices for flat tops; if with galley

top, like above cut, extra 2.00 2.50 3.00

Iron stands, to screw on flat top cabinet to hold cases for compositors to work at, per pair, \$1.50.



No. 23.

PATENT PROJECTING FRONT ECONOMIC CABINET.

This patent cabinet is an improvement on our Economic cabinet, as the addition of the projecting front makes it also serviceable as a printer's type-stand, at which the compositor can work. With all straight front cabinets this cannot be done, as there is no room for the compositor to assume a working position.

It contains on the left a copy drawer and 20 two-third job cases, Yankee or Boston patterns; in the centre, safe receptacles for 5 brass galleys and 16 full-sized job cases; on the right, another copy drawer and 20 two-third job cases, or an equal number of pair or triple cases, to suit purchaser; on the left upper surface are subdivisions for labor-saving leads of various thicknesses, from 4-em pica up, and on the right are spaces for the larger display type, face up, both of which are sunk sufficiently to admit of putting up a pair of cases, left and right, without injury to their contents; and in the centre upper surface there are (always uncovered) every convenience for labor-saving rules, combination borders, right and left ornaments, etc., and standing-galley room.

Two extra pairs of cases go with each cabinet, and are not shown in cut, for the accommodation of the two 56-lb. fonts of body letter; two of the job cases accommodate their *italics*; and the remainder of the ample assortment, enumerated below, is provided with case-room without mixing up any two of the fonts specified.

This cabinet occupies a space only 8 × 3 feet, and embraces the necessary stands, cases, cabinets, galley rack, etc., for an office which, with ordinary furniture, would require a room 15 × 20 feet and cost \$110.

It will thus be seen that the compositor has in this cabinet his material concentrated, directly under his eye and within reach. And there is thus a great saving both in time and wear and tear.

Price, in walnut, \$130. Boxing and shipping, \$5. Galley closet, at end of cabinet, extra, \$5.

CLOTH AND RUBBER BLANKETS.

CLOTH.

Width.	Thick, per yard.	Thin, per yard.
Thirty-four inches .	\$4.50	\$2.75
Thirty-nine inches .	5.00	3.00
Forty-four inches .	5.75	3.25
Forty-seven inches .	6.25	
Fifty-one inches .	6.75	
Fifty-five inches .	7.50	

RUBBER.

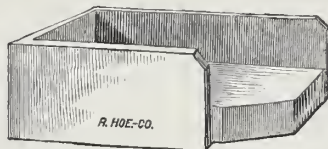
Width.	Three-ply. One-twelfth inch thick.	Five-ply. One-eighth inch thick.	Tympan rubber.
Twenty-six in.	\$6.25	\$8.25	
Thirty-two in.	7.00		
Thirty-four in.		9.25	
Thirty-six in.	7.75		\$1.25
Forty in. . .	8.75	11.75	
Forty-four in.	10.00	13.50	

Roller cloth (in rolls, 12 yards long by 2½ inches wide), per roll, \$5.

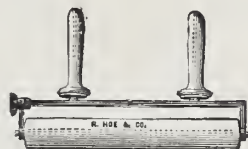
Prices subject to change.



PROOF ROLLER.



INK BLOCK.



JOB ROLLER.

Price, 75 cents.

ROLLER FRAMES, WITH STOCKS.

Dimensions.	Frame with one stock.	Extra stock.	No.	Dimensions.	Frame with one stock.	Extra stock.
6 inches long (1 handle)	\$1.25	\$.40	1.	23 in. long (1 handle)	\$3.00	\$1.00
8 inches long (1 handle)	1.25	.40	2.	26 in. long (1 handle)	3.50	1.10
10 inches long (1 handle)	1.50	.50	3.	31 in. long (1 handle)	4.00	1.25
12 inches long (1 handle)	1.75	.60	4.	36 in. long (1 handle)	4.50	1.40
14 inches long (2 handles)	2.00	.70	5.	44 in. long (1 handle)	5.00	1.55
16 inches long (2 handles)	2.25	.80	6.	49 in. long (1 handle)	5.50	1.70
18 inches long (2 handles)	2.50	.90	7.	53 in. long (1 handle)	6.00	1.85

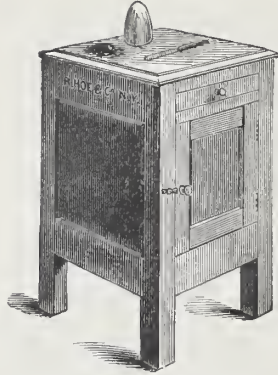
ROLLER MOULDS.

	Per inch in length.		Per inch in length.
To 3 inches in diameter . .	\$.40	To 5 inches in diameter . .	\$.60
To 4 inches in diameter . .	.50	To 6 inches in diameter . .	.95

When ordered of less than usual length, the foot and centre pieces are charged extra.

LINEN TAPE.

	One-half in. wide.	Three-fourths in. wide.	One and one- eighth in. wide.
Two-ply, per roll, thirty-six yards long . . .	\$.75	\$1.25	
Four-ply, per roll, thirty-six yards long . . .	.75		\$1.60

**INK CLOSET.**

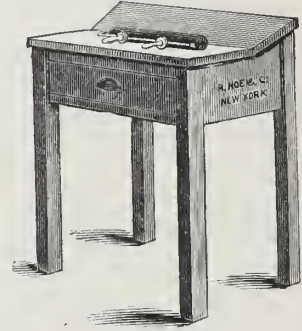
Black walnut, with Italian marble muller and stone (20×20 inches)	\$20.00
Pine, with American marble muller and stone (20×20 inches)	15.00
French marble ink stone and muller only (20×20 inches)	5.00
Italian marble ink stone and muller only (20×20 inches)	7.50

INK BRAYER.

Price	25 cents.
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**COMPOSITION KETTLES.**

	To hold	Per set.
Tin kettles . . .	1½ gallons	\$7.50
Tin kettles . . .	3 gallons	10.00
Copper kettles . .	3 gallons	16.00
Copper kettles . .	12 gallons	65.00
to work by steam.		

**INK TABLE.**

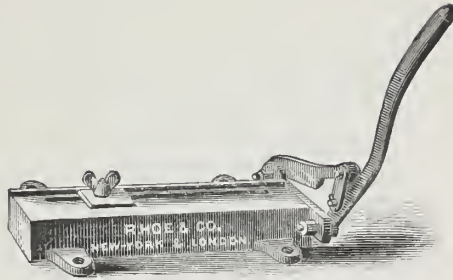
Foolscap, with roller; size of top 18×24 inches	\$7.50
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MISCELLANEOUS.

Patent safety benzine cans, of brass, quarts, each	\$.75
Patent safety benzine cans, of brass, pints, each60
Steel folders . . . . .	.25
Adjustable lead mould, high and low	25.00
Best sperm oil, per gallon	2.00
Quoins, boxwood, per 100 . . . . .	.60
Quoins, hickory, per 100 . . . . .	.40

**INKING BALLS.**

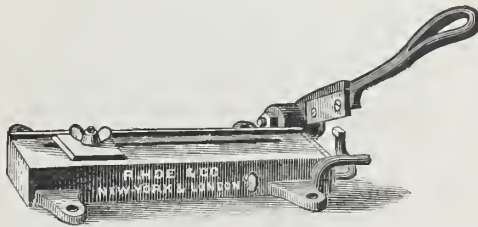
	In diameter.	Per pair.
Balls, made up . .	10 inches	\$7.50
Balls, made up . .	8½ inches	6.00
Balls, made up . .	7 inches	5.00



DOUBLE-LEVER RULE AND LEAD CUTTER.

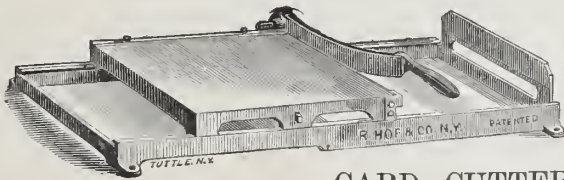
By combination of levers, great power is secured, and the thickest rules are cut with little exertion.

Bed 15 in., shears 4 in. . . \$11.00 | Bed 15 in., with outside gauge, \$11.50



BRASS RULE AND LEAD CUTTER.

Single lever, bed 15 inches, shears 3 inches \$6.00
Single lever, with outside gauge 6.50

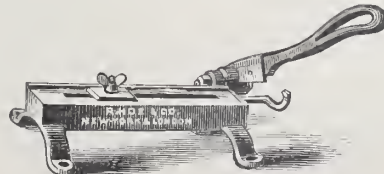


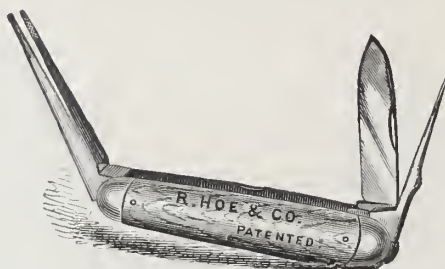
CARD CUTTER.

Size shears, inches.	Price.	Size shears, inches.	Price.
6	\$12.00	15	\$24.00
8	15.00	20	30.00
10	18.00	25	40.00
12	21.00		

LEAD CUTTER.

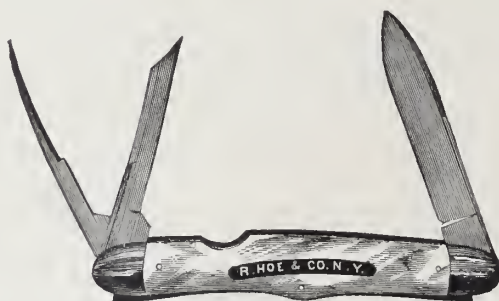
Bed 8½ inches, shears 1¼ inches, \$3.50
Bed 11 inches, shears 1¼ inches, 4.00
With outside gauge.





PATENT KNIFE AND BODKINS.

Price \$2.00



PRINTERS' KNIFE.

Price \$1.50



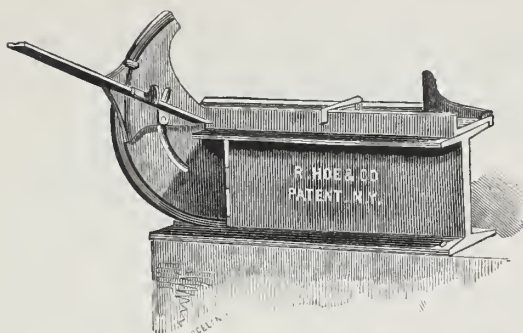
MALLET.

	Small.	Large.
Oval handle, hickory	\$.40	\$.50
Oval handle, lignum-vitæ . . . . .	.50	.75
Oval handle, hickory, iron-bound		1.00



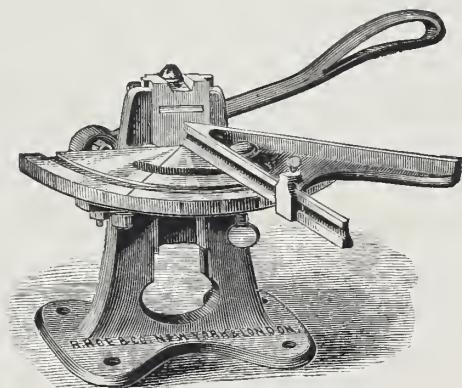
PLANERS.

Hard maple	\$.30
Hard maple, faced with cloth, and backed with leather . . . . .	.50
Hard maple, curved, for rotary presses . . . . .	.75



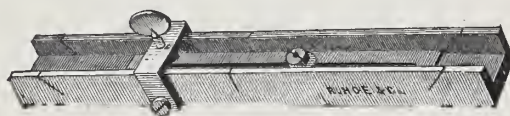
PATENT HORIZONTAL MITERING MACHINE.

Price \$16.00



PATENT UPRIGHT MITERING MACHINE.

Price \$18.00



IRON MITRE BOX.

For brass rule. Price . . . \$5.00 | Saw for iron mitre box . . . \$2.00



HARD-WOOD MITRE BOX.

Price \$.50 | Saw for mitre box \$1.50





SHOOTING STICKS.

Steel, large, bright	\$.75	Steel, small, black	\$.45
Steel, large, black . . . . .	.60	Steel, small, bright . . . . .	.60
Brass	1.00	Hickory . . . . .	.10



FOLDING SPRING BODKIN.

Price 60 cents.



BODKIN.

Steel, with hard-wood handle, 15 cents.



SPRING BODKIN.

All steel, 40 cents.



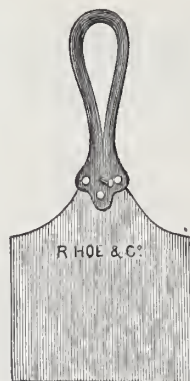
SHEEP'S FOOT.

Price \$1.25



LYE BRUSHES.

Hard wood, with real
bristles, large,
3½ × 6 inches . . \$.90
Hard wood, with real
bristles, small,
3½ × 4 inches . . .75



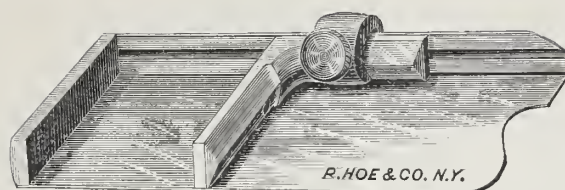
INK SLICE.

All brass, 75 cents.



PROOF BRUSH.

Black walnut backs
and genuine bris-
tles, 3 × 7 inches, \$1.50



Patented February 8, 1876.

PATENT REVERSIBLE KNEE COMPOSING STICK.

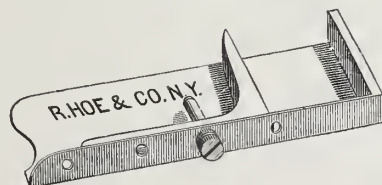
2, 2 $\frac{1}{4}$, OR 2 $\frac{1}{2}$ INCHES DEEP.

In principle and construction, the best in the world. All steel. Warranted true.

The clamp does not project under the bottom of shell, but slides along the bead on the back, so that a proof can be taken from matter in the stick. The bead adds stiffness to the shell, and the inclined position of the screw binds the point of the knee closely against the bottom. The knee can be set instantly and firmly to any position, and when worn it can be reversed, so as to present a fresh side to the type, thus doubling the life of the stick.

PRICES.

	Polished.	Nickel-plated.		Polished.	Nickel-plated.
6 inches	\$.75	\$1.00	14 inches	\$1.30	\$1.60
8 inches . . . . .	.80	1.05	16 inches	1.45	1.75
10 inches	1.00	1.25	18 inches	1.60	1.90
12 inches	1.15	1.40	20 inches	1.75	2.10



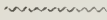









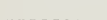










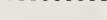


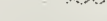



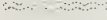

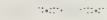

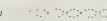

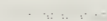

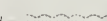



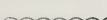


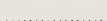

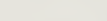

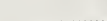

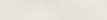

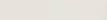

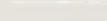



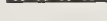









JOB STICKS.

Cherry or walnut.			Mahogany.		Cherry or walnut.			Mahogany.	
Unlined.	Patent lined.		Unlined.	Patent lined.	Unlined.	Patent lined.		Unlined.	Patent lined.
12 inches	\$.80	\$1.00	\$.90	\$1.15	24 inches	\$1.10	\$1.40	\$1.20	\$1.50
14 inches	.85	1.05	.95	1.20	30 inches	1.25	1.60	1.35	1.75
16 inches	.90	1.15	1.00	1.30	36 inches	1.30	1.75	1.50	1.90
20 inches	1.00	1.25	1.10	1.40	40 inches	1.60	2.00	1.75	2.25





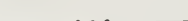


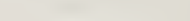



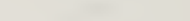

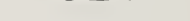

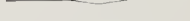
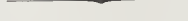
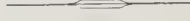

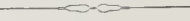







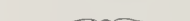


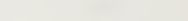

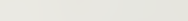

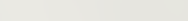

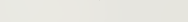



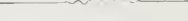



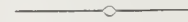









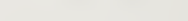

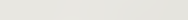




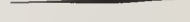
Steel composing rules . 25 cents. Steel make-up rules . . 25 cents.

BRASS RULE.



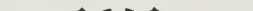

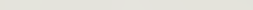
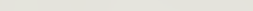
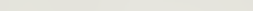
No.		Cents per foot.	No.		Cents per foot.
1.	10 to Pica .	6	52.	3 to Pica .	18
2.	7 to Pica .	6	53.	Pearl . .	22
3.	6 to Pica .	8	54.	$\frac{2}{3}$ of Bourgeois	27
4.	5 to Pica .	10	55.	$\frac{2}{3}$ of L'g prim.	27
5.	4 to Pica .	12	56.	$\frac{2}{3}$ of Sm. pica	32
6.	3 to L'g prim.	14	57.	$\frac{2}{3}$ of Pica .	37
7.	3 to Pica .	18	58.	$\frac{3}{4}$ of Pica .	42
8.	Pearl . .	22	59.	$\frac{3}{4}$ of English	47
9.	Agate . .	22	65.	3 to L'g prim.	14
10.	3 to Gt. prim.	25	66.	3 to Pica .	16
11.	Nonpareil .	27	67.	Pearl . .	20
12.	$\frac{2}{3}$ of L'g prim.	30	68.	3 to Gt. prim.	25
13.	Minion . .	32	69.	$\frac{2}{3}$ of L'g prim.	30
14.	Brevier . .	35	70.	Minion . .	32
15.	2 to Gt. prim.	37	71.	$\frac{2}{3}$ of Pica .	37
16.	$\frac{2}{3}$ English .	42	72.	$\frac{3}{4}$ of Pica .	42
17.	Long primer	47	73.	$\frac{3}{4}$ of English	47
18.	$\frac{3}{4}$ of English	52	74.	$\frac{2}{3}$ of Gt. prim.	52
19.	Pica . .	60	75.	$\frac{3}{4}$ of Paragon	68
30.	5 to Pica .	10	76.	3-line Agate	75
31.	4 to Pica .	12	77.	2-line Bourg.	90
32.	2 to Minion	16	90.	3 to Gt. prim.	25
33.	3 to Pica .	18	91.*	Minion . .	32
34.	3 to Pica .	20	92.	$\frac{2}{3}$ of Pica .	35
35.	Pearl . .	22	100.	7 to Pica .	10
36.	3 to Gt. prim.	27	101.	7 to Pica .	10
37.	$\frac{2}{3}$ of L'g prim.	32	102.	7 to Pica .	10
38.	Minion . .	37	103.	7 to Pica .	10
39.	$\frac{2}{3}$ of Pica .	38	104.	7 to Pica .	10
40.	$\frac{3}{4}$ of Pica .	42	105.	7 to Pica .	10
41.	$\frac{3}{4}$ of English	47	110.	7 to Pica .	10
50.	3 to Bourgeois	10	111.	7 to Pica .	10
51.	3 to L'g prim.	14			

No.		Cents per foot.	No.		Cents per foot.
112.	5 to Pica . 	12	176.	8 to Pica . 	12
113.	5 to Pica . 	12	177.	3 to Pica . 	18
114.	3 to Small pica 	16	178.	Minion . 	40
115.	3 to Small pica 	16	190.	3 to Small pica 	16
116.	5 to Pica . 	12	191.	3 to Small pica 	16
121.	5 to Pica . 	12	192.	3 to Small pica 	16
122.	5 to Pica . 	12	193.	3 to Small pica 	16
123.	5 to Pica . 	12	194.	3 to Small pica 	16
124.	5 to Pica . 	12	195.	3 to Small pica 	16
125.	3 to Small pica 	16	196.	3 to Pica . 	16
126.	3 to Small pica 	16	197.	3 to Pica . 	18
135.	4 to Pica . 	16	198.	3 to L'g prim. 	18
138.	3 to L'g prim. 	16	199.	2 to Small pica 	18
139.	2 to Minion 	16	200.	6 to Pica . 	12
140.	3 to L'g prim. 	16	201.	3 to Small pica 	22
141.	3 to Small pica 	16	202.	2 to Small pica 	22
142.	3 to L'g prim. 	16	203.	3 to Pica . 	22
143.	3 to Small pica 	16	204.	6 to Pica . 	12
144.	3 to L'g prim. 	16	205.	3 to Pica . 	22
145.	3 to Small pica 	16	206.	Pearl . 	22
146.	3 to L'g prim. 	16	207.	6 to Pica . 	20
147.	3 to Small pica 	16	208.	3 to L'g prim. 	18
148.	3 to Small pica 	16	209.	Minion . 	40
149.	3 to L'g prim. 	16	210.	3 to Minion 	12
150.	3 to Small pica 	16	211.	Pearl . 	22
151.	3 to Small pica 	16	212.	6 to Pica . 	12
158.	3 to L'g prim. 	16	213.	6 to Pica . 	12
159.	3 to Small pica 	16	214.	3 to L'g prim. 	18
160.	3 to L'g prim. 	16	215.	3 to Small pica 	22
161.	3 to Small pica 	16	216.	Pearl . 	24
162.	3 to L'g prim. 	16	217.	Pearl . 	24
163.	3 to Small pica 	16	218.	$\frac{3}{4}$ of L'g prim. 	35
164.	3 to Small pica 	16	219.	Pearl . 	30
165.	3 to Pica . 	20			

BRASS DASHES.

No.		Cents each.	No.		Cents each.
1.	3 to Pica . 	9	32.	3 to Pica . 	10
2.	3 to Pica . 	9	33.	3 to Pica . 	10
3.	3 to Pica . 	9	34.	3 to Pica . 	10
4.	3 to Pica . 	9	35.	3 to Pica . 	12
5.	3 to Pica . 	9	36.	3 to Pica . 	12
6.	3 to Pica . 	9	37.	3 to Pica . 	12
7.	3 to Pica . 	9	38.	3 to Pica . 	12
8.	3 to Pica . 	9	39.	3 to Pica . 	12
9.	3 to Pica . 	9	40.	3 to Pica . 	12
10.	3 to Pica . 	9	41.	3 to Pica . 	12
11.	3 to Pica . 	9	42.	3 to Pica . 	12
12.	3 to Pica . 	9	43.	3 to Pica . 	12
13.	3 to Pica . 	9	44.	3 to Pica . 	12
14.	3 to Pica . 	9	45.	3 to Pica . 	12
15.	3 to Pica . 	9	46.	3 to Pica . 	12
16.	3 to Pica . 	9	47.	3 to Pica . 	12
17.	3 to Pica . 	9	48.	3 to Long primer 	9
18.	3 to Pica . 	9	49.	3 to Long primer 	9
19.	5 to Pica . 	9	50.	3 to Long prim. 	9
20.	5 to Pica . 	9	51.	3 to L'g prim. 	9
21.	3 to Pica . 	10	52.	3 to Sm. pica 	9
22.	3 to Pica . 	12	53.	3 to Pica . 	9
23.	3 to Pica . 	10	54.	3 to Pica . 	9
24.	3 to Pica . 	10	55.	3 to Pica . 	9
25.	3 to Pica . 	10	56.	3 to Pica . 	9
26.	3 to Pica . 	10	57.	3 to Pica . 	9
27.	3 to Pica . 	10	58.	3 to Pica . 	9
28.	3 to Pica . 	10	59.	3 to Pica . 	9
29.	3 to Pica . 	10	60.	Pearl . 	9
30.	3 to Pica . 	10	61.	Diamond 	9
31.	3 to Pica . 	10	62.	Agate 	9

Brass Dashes, continued.

No.			Cents each.
63.	3 to Pica		9
64.	3 to Pica		9
65.	3 to Great primer		10
66.	3 to Great primer		10
67.	3 to Great primer		10
68.	3 to Great primer		10
69.	3 to Great primer		10

PERFORATING RULE.

Brass 25 cents per foot. | Steel 75 cents per foot.

BRASS COLUMN RULES.

	Nonpareil thickness.	Brevier thickness.	Minion thickness.	Long Primer thickness.	Small Pica thickness.
Twelve inches and under . . .	\$.25	\$.35	\$.32	\$.40	\$.45
Fifteen inches and under . . .	.35	.50	.45	.55	.70
Eighteen inches and under . . .	.45	.60	.55	.70	.75
Twenty-four inches and under . .	.50	.70	.65	.80	.90
Each additional inch . . . . .	.02	.04	.03	.05	.06
Notching column rules under, for the use of brass reglet . . . each,					.05
Composing-rule steel, per strip, twenty-four inches long . . . each,					.75
Make-up-rule steel, per strip, twenty-four inches long . . . each,					.75
Brass "leads," four to eight to pica per lb.,					.75

REGLET, FURNITURE, AND SIDE STICKS.

Done up in quantities of twenty, fifty, and one hundred yards, and plainly marked.

Per yard.	Cherry.	Pine.	Per yard.	Cherry.	Pine.
Smaller than two-l. pica	\$.03	\$.02	Thirteen to sixteen l. pica	\$.08	\$.06
Two to five line pica . . .	.04	.03	Bearers . . . . .	.12	
Six to twelve line pica . . .	.06	.05	Side sticks . . . . .	.06	

Twenty-five per cent. discount when ordered in lots of one hundred yards. We have every facility for cutting reglet or furniture, accurately and cheaply, to any measurement.

LABOR-SAVING FURNITURE.

Finished in oil and made from two to ten ems pica, by picas in length. The size is stamped on end of each piece. A neat case is furnished when desired, for keeping furniture in order.

	Stained pine case.	Cherry case.
Single case, containing 560 pieces	\$10.00	\$12.00
Double case, containing 1120 pieces	16.00	22.00
Cherry blocking, three-fourths inch thick	per square foot, 25 cents.	
Mahogany blocking, three-fourths inch thick	per square foot, 45 cents.	

NEWSPAPER RULES AND DASHES.

	Straight, each.	Curved, each.		Curved, each.
Advertisement . . .	4 cts.	9 cts.	Head, single (steel) . . .	\$2.50
Wave	6 cts.	11 cts.	Head, parallel (steel) . . .	2.50
Parallel	6 cts.	11 cts.	Head, double (steel) . . .	2.50
Double and mourning	6 cts.	11 cts.		Each.
	Straight, each.	Curved, per inch.	Wave, parallel, and double cur- ved dashes . . . . .	.15
Single head . . .	6 cts.	6 cts.	Plain and misery curved dashes . . . . .	.12
Double head . . .	6 cts.	7 cts.	Fancy curved dashes . . .	.22
Parallel head . . .	6 cts.	7 cts.		

LABOR-SAVING RULES.

Sets of the single rule, assorted lengths, per lb.	\$2.00
Sets of the parallel or double rule, assorted lengths, per lb.	1.75
Sets of the dotted rule, assorted lengths	2.00

Additional pieces of any length, cut to ems, will be furnished to order.

BRASS RULE—LABOR SAVING.

Single, Dotted, Hyphen, Parallel, and Double.	Three- lb. fonts, each.	Five- lb. fonts, each.	Ten- lb. fonts, each.	Fifteen- lb. fonts, each.
Six to pica and eight to pica	\$6.00	\$10.00	\$20.00	
Four to small pica and four to pica	4.80	8.00	16.00	
Three to pica	4.75	7.50	15.00	
Agate, nonpareil, minion, and brevier	4.50	7.50	15.00	
Bourgeois, long primer, small pica, and pica		7.00	14.00	\$21.00

Our labor-saving rule is cut on mitre machine, and not sawed off, as by other makers.

SUGGESTIONS TO PRINTERS.

When you order TYPE for newspaper or book work, state whether or not you want the fonts to contain italics, accents, leaders, fractions, or commercial marks.

In ordering SORTS to match type you already have, state the number of the face, as well as the size of the body; or, if you cannot do this, then send a capital H and a lower-case m (as little used as possible) of the fonts the sorts are to work with;


also state the number of pounds or ounces that you wish of each particular sort.

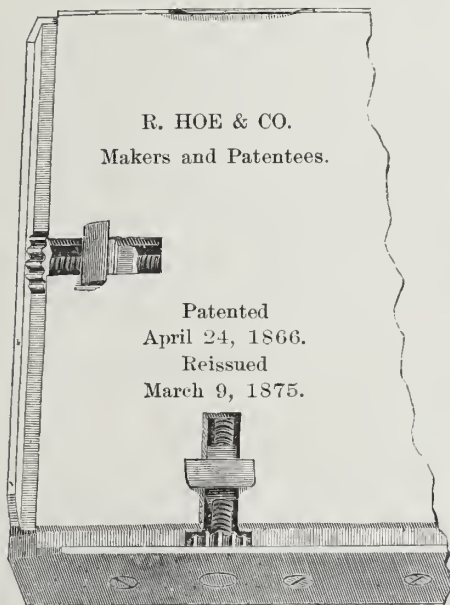
JOB FONTS, such as title, antique, clarendon, ornamented, etc. (except scripts), are put up without spaces and quads, and if you want them to any size body it will be necessary for you to mention it when ordering.

Prices of type are subject to change from time to time.

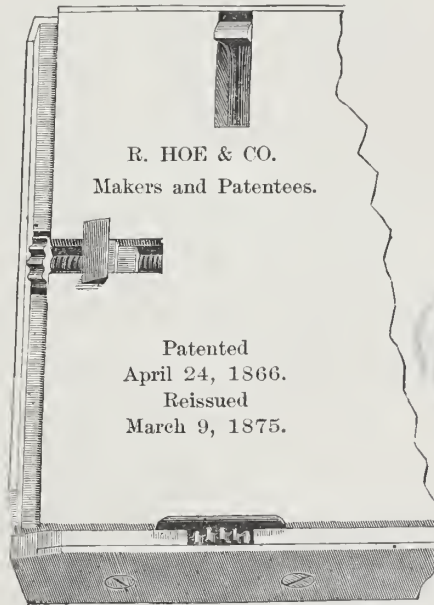
PATENTED STEREOTYPE BLOCKS.

The superior quality of the material and the workmanship in these blocks, and their accuracy, are well known. Every portion is made and fitted with the utmost care. We have increased our facilities for their manufacture. A large stock of the best San Domingo mahogany, thoroughly seasoned and planed up, is kept on hand. The different parts are also kept in stock, ready for use, enabling us to *fill orders for blocks in any quantity, or of any size, in from twenty-four to forty-eight hours after receipt of order.* Orders may be sent by telegraph or telephone.

 *Any clasp or hook which moves in fixed bearings upon a screw, infringes our patented rights, and all infringers will be prosecuted.*



New style patent block, with end hook.



Plain block, with patent end hook.



DIMENSIONS AND PRICES WITHOUT END HOOK.

Folio:	Dimensions.				Prices without end hook.		
	Outside dimensions of blocks.	Size of largest plate taken on.	Size of smallest plate taken on.	No. of side hooks.	Plain mahogany.	Patent mahogany.	Patent iron.
Imperial .	16 × 22½	15½ × 22½	14¾ × 21¼	4	\$5.25	\$6.75	\$16.00
Sup. Royal	13½ × 21½	13 × 21½	12¼ × 20¼	4	4.75	6.25	15.00
Royal . .	12½ × 19½	12 × 19½	11¼ × 18¼	4	4.25	5.75	14.00
Medium .	11½ × 18½	11 × 18½	10¼ × 17¼	4	3.75	5.25	13.00
Demy . .	11 × 16	10½ × 16	9¾ × 14¾	4	3.25	4.25	12.00

DIMENSIONS AND PRICES WITHOUT END HOOK.

	Dimensions.				Prices without end hook.		
	Outside dimensions of blocks.	Size of largest plate taken on.	Size of smallest plate taken on.	No. of side hooks.	Plain mahog- any.	Patent mahog- any.	Patent iron.
Quarto:							
Imperial .	11 × 16	10½ × 16	9¾ × 14¾	4	\$3.25	\$4.25	\$12.00
Sup. Royal	10½ × 13½	10 × 13½	9¼ × 12¼	3	3.00	4.00	10.50
Royal . .	9½ × 12½	9 × 12½	8¼ × 11¼	3	2.75	3.75	10.00
Medium .	9 × 11½	8½ × 11½	7¾ × 10¾	3	2.50	3.50	9.50
Demy . .	7¾ × 11	7¼ × 11	6½ × 9¾	3	2.25	3.25	9.00
Octavo:							
Imperial .	7¾ × 11	6½ × 11	5¾ × 9¾	3	2.25	3.25	9.00
Sup. Royal	6½ × 10½	6 × 10	5¼ × 9¼	3	2.00	2.75	8.25
Royal . .	6 × 9½	5½ × 9½	4¾ × 8¼	3	1.85	2.50	8.00
Medium .	5½ × 9	5 × 9	4¼ × 7¾	3	1.70	2.25	7.75
Demy . .	5¼ × 7¾	4¾ × 7¾	4 × 6½	3	1.55	2.00	7.50
Duodecimo:							
Broad . .	5¼ × 6¾	4¾ × 6¾	4 × 5½	2	1.30	1.65	
Sixteenmo:							
Sup. Royal	5 × 6½	4½ × 6½	3¾ × 5¼	2	1.20	1.50	
Medium .	4½ × 6	4 × 6	3¼ × 4¾	2	1.10	1.35	
Demy . .	3¾ × 5¼	3¼ × 5¼	2½ × 4	2	1.00	1.20	
Eighteenmo:							
Medium .	3½ × 5¾	3 × 5¾	2¼ × 4½	2	.90	1.10	
Thirty-two mo							
Sup. Royal	3 × 5	2½ × 5	1¾ × 3¾	2	.80	1.00	

PRICES WITH END HOOKS FOR CYLINDER PRESSES.

	No. of side & end hooks.	Plain mahogany.	New style patent mahogany.	Patent iron.	Proper number of blocks to work a sheet of paper.
Folio:					
Imperial . . .	7	\$7.50	\$9.00	\$24.00	4 blocks to 33 × 46
Super Royal .	7	7.00	8.50	22.00	2 blocks to 22 × 28
Royal	7	6.50	8.00	20.00	4 blocks to 26 × 40
Medium	7	6.00	7.50	18.00	4 blocks to 24 × 38
Demy	6	5.50	6.50	16.00	8 blocks to 33 × 46
Quarto:					
Imperial . . .	6	5.50	6.50	16.00	8 blocks to 33 × 46
Super Royal .	5	4.50	5.50	14.50	4 blocks to 22 × 28
Royal	5	4.25	5.25	13.00	8 blocks to 26 × 40
Medium	5	3.75	5.00	12.00	8 blocks to 24 × 38
Demy	4	3.00	4.00	11.00	16 blocks to 33 × 46
Octavo:					
Imperial . . .	4	3.00	4.00	11.00	16 blocks to 33 × 46
Super Royal .	4	2.75	3.50	10.00	8 blocks to 22 × 28
Royal	4	2.60	3.25	9.50	16 blocks to 26 × 40
Medium	4	2.45	3.00	9.00	16 blocks to 24 × 38
Demy	4	2.30	2.75	8.50	32 blocks to 33 × 46

PRICES WITH END HOOKS FOR CYLINDER PRESSES.

	No. of side & end hooks.	Plain mahogany.	New style patent mahogany.	Proper number of blocks to work a sheet of paper.
Duodecimo:				
Broad	3	\$2.05	\$2.40	24 blocks to 23 × 41
Sixteenmo:				
Super Royal	3	1.95	2.25	16 blocks to 22 × 28
Medium	3	1.85	2.10	32 blocks to 26 × 40
Demy	3	1.75	1.95	32 blocks to 23 × 33
Eighteenmo:				
Medium	3	1.65	1.85	18 blocks to 19 × 24
Thirty-twomo:				
Super Royal	3	1.55	1.75	32 blocks to 22 × 28

Blocks with end hook will take plate nine-sixteenths of an inch shorter than the largest plate.

Rule borders extra, according to the size and style.

Extra brass hooks, with steel pinions, inserted in wood blocks at 75 cents each, and in iron blocks at \$1.00 each. Stereotype ratchets, 50 cents.

In sending orders, give the size of each block outside, and also the size of largest and smallest plate to be worked, measuring the back of the plate. All blocks are made three-quarter inch thick, unless otherwise ordered.

ABOUT CARE AND USE OF BLOCKS.

To prevent warping, patent blocks should never be sent to the washing trough, nor allowed to lie on a wet stone. Where plates have to be cleaned up on press, use no more benzine than is needed; when cleaning is over, sop up with a moist sponge, and make dry with rags or waste. Blocks should be frequently cleaned and oiled, special care being taken to keep the mortises and screw-threads free from dirt. When not in use keep in a dry and close closet, where they will not be exposed to dust or to changes of temperature.

Never order a set of new blocks, nor make up a form of patent blocks for press, until you know the exact size of the chase that must hold the blocks, and the thickness and position of its cross-bars.

Ascertain also the exact size of the paper for which the blocks are intended; and whether the leaves of the paper after print-

ing are to be cut or uncut, to be sewed or to be stitched.

In making-up blocks, if the paper is to be uncut and sewed, allow nothing for loss by waste on the fore edge; if it is to be side-stitched and trimmed, make suitable allowance for the margin that will be cut off or concealed in binding.

Always make up the margins full to the paper that will be used, so that the sheet can be evenly folded by edges, and trimmed, if necessary, after the folding. Never make up blocks with irregular margins that compel the cutting and the waste of paper before folding.

When you can do so, put in every gutter, at every head, and on the sides of every cross-bar, one or two pieces of nonpareil or pica reglet, so that the margins can be easily corrected if they are found faulty on the first proof.

ESTIMATE FOR PRESS, TYPE, AND MATERIALS

	Six-column folio sheet, 22 × 32.	Seven-column folio sheet, 24 × 36.
Regular single large cylinder press, with roller moulds, blankets, and two sets stocks, boxed, on board . . . . .	. . . . .	. . . . .
Hand cylinder press, with moulds, blankets, and two sets stocks—boxed, on board . . . . .	. . . . .	. . . . .
Washington hand-press, with two pair points, one screw-wrench, one brayer, one slice, one extra frisket—boxed, on board	No. 4, \$225.00	No. 4½, \$240.00
Common distributors	No. 4, 18.00	No. 4½, 19.00
Roller moulds	No. 4, 17.00	No. 4½, 21.00
Half chases . . . . .	. . . . .	. . . . .
News chases	2 No. 4, 13.00	2 No. 4½, 14.00
Iron side and foot sticks	4 3.60	4 4.30
Furniture, @ \$3.00 per 100 yards	100 3.00	100 3.00
Quoins, @ 40 cents per hundred	200 .80	200 .80
Mallet, 40 cents; planer, 30 cents; steel shoot- ing stick, 75 cents	1 1.45	1 1.45
Double iron imposing bed and frame	No. 4, 54.00	No. 5, 67.00
News ink, @ 20 cents per pound	25 5.00	25 5.00
Composition kettle, tin	7.50	7.50
Composition kettle, copper . . . . .	. . . . .	. . . . .
Roller composition, @ 20 cents per pound	25 5.00	25 5.00
Lye brush, 75 cents; proof brush, \$1.50	2.25	2.25
Ready proof press, without stand	20.00	20.00
Ready proof press, with wood stand . . . . .	. . . . .	. . . . .
Ready proof press, with iron stand . . . . .	. . . . .	. . . . .
Proof roller	1 1.25	1 1.25
Ink stone and knife	3.75	3.75
Pairs cases, plain, @ \$1.60	8 12.80	10 16.00
Job cases, plain, @ 90 cents	3 2.70	3 2.70
Cabinet with galley-top, pine	12 two-thirds, 17.00	12 two-thirds, 17.00
No. 5 wooden double stands, with racks, @ \$4.50	2 9.00	3 13.50
Composing sticks, eight-inch, @ 95 cents	3 2.85	4 3.80
Composing rules, @ 25 cents	3 .75	4 1.00
Proof galleys, single column, patent lined, @ \$2.00	6 12.00	6 12.00
Common wood galleys, @ 60 cents	6 3.60	6 3.60
Standing galley—about . . . . .	. . . . .	. . . . .
Galley rack	4.00	4.00
Saw and mitre box	1 2.00	1 2.00
Amount carried forward	\$447.30	\$490.90

FOR A WEEKLY PAPER OF SMALL CIRCULATION.

Eight-column folio sheet, 26 × 40.	Five-column quarto sheet, 26 × 40.	Nine-column folio sheet, 28 × 44.	Six-column quarto sheet, 30 × 44.	Seven-column quarto sheet, 35 or 36 × 48.
.
.
No. 5, \$250.00	No. 5, \$250.00	No. 6, \$275.00	No. 6, \$275.00	No. 8, \$350.00
No. 5, 19.00	. . . . .	. . . . .	. . . . .	. . . . .
No. 5, 21.00	. . . . .	. . . . .	. . . . .	. . . . .
4 28.00	4 28.00	4 35.00	4 38.00	4 44.00
.
4 4.30	4 4.30	4 4.80	4 4.80	4 5.80
200 6.00	200 6.00	200 6.00	400 8.00	400 8.00
300 1.20	300 1.20	300 1.20	400 1.60	400 1.60
1 1.45	1 1.45	1 1.45	1 1.45	1 1.45
No. 5, 67.00	No. 5, 67.00	No. 6, 84.00	No. 6, 84.00	No. 6, 98.00
25 5.00	50 10.00	50 10.00	100 20.00	100 20.00
7.50	. . . . .	. . . . .	. . . . .	. . . . .
.	16.00	16.00	16.00	16.00
25 5.00	50 10.00	50 10.00	100 20.00	100 20.00
2.25	2.25	1 2.25	2 4.50	2 4.50
.
28.00	28.00	. . . . .	. . . . .	. . . . .
. . . . .	. . . . .	50.00	50.00	50.00
1 1.25	1 1.25	1 1.25	1 1.25	1 1.25
3.75	. . . . .	. . . . .	. . . . .	. . . . .
14 22.40	16 25.60	18 28.80	25 40.00	30 48.00
3 2.70	4 3.60	5 4.50	6 5.40	6 5.40
16 two-thirds, 24.00	20 two-thirds, 32.00	20 two-thirds, 32.00	20 two-thirds, 32.00	20 full, 34.00
5 22.50	5 22.50	6 27.00	8 36.00	10 45.00
6 5.70	6 5.70	8 7.60	10 9.50	12 11.40
6 1.50	6 1.50	6 1.50	8 2.00	10 2.50
8 16.00	12 24.00	12 24.00	16 32.00	20 40.00
6 3.60	8 4.80	8 4.80	10 6.00	10 6.00
.	40.00	50.00	60.00	75.00
5.00	5.00	6.00	6.00	7.00
1 2.00	1 2.00	1 2.00	1 2.00	1 2.00
\$556.10	\$592.15	\$685.15	\$755.50	\$906.90

ESTIMATE FOR PRESS, TYPE, AND MATERIALS

	Six-column folio sheet, 22 x 32.		Seven-column folio sheet, 24 x 36.	
Amount brought forward,		\$447.30		\$490.90
Lamp-holders, @ 75 cents	2	1.50	3	2.25
Head of paper, about		4.00		4.50
Head rules, about	5	1.25	5	1.50
Column rules, according to thickness, about	20	10.00	24	12.00
Advertisement rules, single, @ 4 cents . . .	75	3.00	100	4.00
Advertisement rules, double, @ 6 cents . . .	8	.48	10	.60
Advertisement rules, parallel, @ 6 cents . .	8	.48	10	.60
Dash rules, single, @ 7 cents	10	.70	10	.70
Dash rules, double, @ 8 cents	5	.40	5	.40
Brass dashes, @ 9 cents	20	1.80	25	2.25
Long primer pounds, @ 42 cents				
Bourgeois, . pounds, @ 44 cents	225	99.00	300	132.00
Brevier, . . pounds, @ 48 cents				
Minion, . . pounds, @ 52 cents				
Nonpareil, . pounds, @ 58 cents	200	116.00	250	145.00
Display type, fonts, about	12	50.00	15	60.00
Leads and slugs, pounds, about 18 cents . .	25	4.50	30	5.40
Numbered slugs, about				
Assortment of cuts, about		5.00		10.00
Boxing about		8.00		9.00
		\$753.41		\$881.10

HINTS ON THE PURCHASE OF TYPE.

Select faces and bodies carefully. Buy according to your ability and your need, but only what you can use to profit. Consider well how you can use a face before you purchase it. Don't buy it because it is a pretty style. It may be pretty, and yet unsuitable for general work.

Give preference to the regular bodies of Roman type—pearl, nonpareil, brevier, long primer, pica, great primer, double small pica, and the multiples of pica.

Get as large fonts as you can afford to buy. One font of 500 pounds of long primer is more useful and more durable than two fonts of long primer and bourgeois, each of 250 pounds. Small fonts

are always unequally and unduly worn. The two small fonts will cost more, earn less, and wear out sooner than one large font.

Select uniform faces as far as possible. The symmetry of harmonious faces is always pleasing. For a very large office, it may be judicious to get a series of two or three styles of faces. In such case let these series be very perceptibly unlike. But in all cases maintain the uniformity of each series. Do not allow your customers to choose for you. To buy faces without system, to please a passing fancy, is sure to make great trouble. It is impossible to keep them separate, and yet, when mixed, they make the greatest confusion and loss.

FOR A WEEKLY PAPER OF SMALL CIRCULATION.

Eight-column folio sheet, 26 x 40.	Five-column quarto sheet, 26 x 40.	Nine-column folio sheet, 28 x 44.	Six-column quarto sheet, 30 x 44.	Seven-column quarto sheet, 35 or 36 x 48.
\$556.10	\$592.15	\$685.15	\$755.50	\$906.90
5 3.75	5 3.75	6 4.50	8 6.00	10 7.50
4.50	4.00	5.00	5.00	6.00
5 1.75	9 2.70	5 2.00	9 2.70	9 3.60
28 16.80	32 24.00	32 19.20	40 24.00	48 36.00
150 6.00	200 8.00	200 8.00	250 10.00	300 12.00
15 .90	20 1.20	20 1.20	25 1.50	30 1.80
15 .90	20 1.20	20 1.20	25 1.50	30 1.80
20 1.40	20 1.40	50 3.50	100 7.00	100 7.00
10 80.	10 .80	25 2.00	50 4.00	50 4.00
30 2.70	40 3.60	40 3.60	60 5.40	75 6.75
.	400 200.00	450 225.00	500 250.00	700 350.00
375 165.00	. . . . .	. . . . .	. . . . .	. . . . .
.	350 168.00	400 192.00	400 192.00	500 240.00
.
300 174.00	. . . . .	. . . . .	200 116.00	300 174.00
70.00	20 80.00	80.00	90.00	100.00
40 7.20	50 9.00	60 10.80	70 12.60	80 14.40
. . . . .	. . . . .	. . . . .	10.00	20.00
10.00	10.00	15.00	15.00	15.00
10.00	10.00	14.00	16.00	20.00
\$1031.80	\$1119.80	\$1272.15	\$1524.20	\$1926.75

HINTS ON THE PURCHASE OF TYPE.

Order sorts suitable for your own peculiar class of work. The assortment sold by the founder is for general work only. The special work that may require a profusion of figures, capitals, points, accents, etc., must have these special sorts added to the font.

For job work get abundance of quadrats—double or treble the ordinary supply. To limit the font to the allowance of the type-founder's scheme is to deprive the office of all the advantages of fat matter, of poetry, and of tables, etc. With an insufficient supply of quadrats, such matter becomes lean and unprofitable. A careful examination of miscellaneous job work, like

bill-heads, bills of lading, checks, displayed circulars, etc., will show that the surface area of the type is but half of the entire area. The other half must be quadrats, leads, quotations, furniture, etc. The provision of fat matter of this nature for a job office should be, in bulk, as great as that of type. Most job offices are sadly deficient in blanking-out material. Where this is the case, the compositor works to disadvantage, and the office loses more than the value of the deficient material.

Get plenty of leads. The free use of leads is not only profitable in measurement, but is of economical advantage in extending the capacity of the font.

PRICE LIST OF TYPE FROM ANY FOUNDRY IN THE UNITED STATES.

Price per pound.

Sizes.	Roman, Italic, and German.		Antique Condensed, Title, Borders, etc.	Shaded, Ornamented, Script, etc.	Superiors.	Signs.
	In fonts less than 25 lbs.	In fonts over 25 lbs.				
Diamond . . .	\$2.50	\$1.50	\$2.50	\$3.20	. .	. .
Pearl	1.80	1.08	1.80	2.80	\$2.80	. .
Agate	1.44	.68	1.44	2.40	2.40	\$1.44
Nonpareil . .	1.16	.58	1.16	2.00	2.00	1.06
Minion	1.00	.52	1.00	1.80	1.80	1.00
Brevier . . . .	.90	.48	.90	1.60	1.60	.90
Bourgeois . .	.80	.44	.80	1.44	1.44	.80
Long primer .	.74	.42	.74	1.30	1.30	.74
Small pica . .	.70	.40	.70	1.22	1.22	.70
Pica . . . . .	.66	.38	.66	1.16	1.16	.66
English . . . .	. .	. .	. .	. .	1.12	. .

Sizes.	Roman, Italic, German. Fonts of 25 lbs. and over	Antique Con- densed, Title, Borders, etc.	Shaded, Orna- mented, Script, etc.	Sizes.	Roman, Italic, German. Fonts of 25 lbs. and over	Antique Con- densed, Title, Borders, etc.	Shaded, Orna- mented, Script, etc.
English	\$.38	\$.62	\$1.10	Canon	\$.38	\$.54	\$.72
Columbian . .	.38	.60	. .	Four-line pica .	.38	.54	.72
Great primer .	.38	.60	1.00	Five-line pica .	.38	.52	.64
Paragon . . .	.38	.60	.94	Six-line pica . .	.38	.52	.64
Dbl. small pica	.38	.56	.90	Seven-line pica.	.38	.50	.60
Double pica .	.38	.56	.90	Eight-line pica .	.38	.50	.60
Two-l. English .	.38	.56	.86	Nine-line pica .	. .	.48	.58
Two-line great				Ten-line pica . .	. .	.48	.58
primer . .	.38	.56	.82	Eleven-line pica	. .	.46	.56
Double paragon	.38	.54	.78	Twelve-line pica	. .	.46	.56

PIECE FRACTIONS.

	Per lb.
Brevier (half-brevier body) . .	\$3.50
Bourgeois (diamond body) . .	3.20
Long primer (pearl body) . .	2.80
Small pica (agate body) . . .	2.40
Pica (nonpareil body)	2.00

LEADS.

	Per lb.
Six to pica or thicker	\$.18
Seven to pica . . . . .	.24
Eight to pica . . . . .	.28
Nine to pica . . . . .	.44
Ten to pica . . . . .	.56

MISCELLANEOUS.

	Per font.		Per set.		Each.
Comb'n borders	\$2.00 @ \$18.00	Corners & centres	25c. @ \$6.25	Brass circles	60c.
Brass flourishes	5.00 @ 8.00	Brass braces . . .	5.00	Brass dashes	10c.
Metal flourishes	5.00 @ 25.00	Circular quads . .	3.50	Brass ovals	90c.

ELECTROTYPING
AND
STEREOTYPING.

ELECTROTYPING AND STEREOTYPING.

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I.

ELECTROTYPING.

As applied to letter-press printing, electrotyping is strictly an American art. Experiments were made, both in England and France, some years ago, but all proved failures in practice. In 1841, Mr. Joseph A. Adams, a wood-engraver of this city, reproduced and printed an engraving in a magazine published by James J. Mapes, in New-York; he also, in 1843, electrotyped the various borders around the larger engravings in "Harper's Illustrated Bible." Mr. Daniel Davis, of Boston, a manufacturer of magnetic machines, in 1842, made and used electrotypes plates of engravings and letter-press in his "Manual of Magnetism"; but he made no trade of it. To Mr. Wilcox, of the last-named city, is due the credit of first making a business of electrotyping shortly after, and also the credit of making many early improvements of importance. He was followed by Filmer, Gay, Lovejoy, Wheeler, Ferguson, Knight, Ward, and others, each making contributions more or less valuable to this art, which now ranks next in importance to printing.

The following familiar account of the process of electrotyping, with descriptions of the most improved machinery and tools now in use in the best establishments in the United States, should make the practice of the art perfectly simple:

Electrotyping, as distinguished from *electroplating*, is duplicating printing surfaces in copper by means of a galvanic current, and suitably mounting them for use on the press.

To effect the whole operation intelligently and well demands special knowledge on the part of the compositor, the electrotyper proper, and the moulder.

ARRANGEMENT OF THE ESTABLISHMENT.

It is necessary, for work on a large scale, to have a depositing room, vats for solutions, scouring and cleaning apparatus, batteries (or a magneto-electric machine), etc., etc.

The depositing room is best on the ground floor, on account of the weight of the vats. It should have a cemented and drained floor, be well lighted and ventilated, and have a plentiful water supply.

Vats for sulphate of copper solution are usually of wood, lined with pitch. Cedar makes the best.

The batteries should be in a separate and open room, as their vapors are very nauseous. Where a dynamo machine is used, it should be away from the vats, on account of the moisture.

PREPARING THE FORMS.

When forms are to be electrotyped, it is necessary that great care should be exercised in choosing the type, rules, etc., in justifying the matter, and in locking up the form.

COMPOSITION.

Every quad, space, lead, slug, reglet, or piece of furniture should be high.

Some leads have one or both edges bevelled; but even though the bevel is small it is sufficient to cause considerable trouble, and such leads should not be used in moulding, as the wax is sure to be forced into the space of the bevel, to be broken off, and to require extra labor in distributing the type, besides making it necessary to scrape the wax from the leads before they can be used again.

So far as possible, use thick rules, and those having a bevel on each side of the face. Thin rules make so small an opening in the wax there is great difficulty in black-leading the mould, and in the battery the copper may bridge across a small opening, leaving the face and sides of the rule uncovered, or at most with but a thin, imperfect deposit that is useless. For this reason, type having considerable bevel is best for electrotyping. English type has more bevel than American. Bevelled rules also make impressions in which the hairs of the black-leading brush can penetrate more deeply. Type-high bearers or guards, about one-fourth of an inch thick, should be put around each page and scattered through the blank spaces, to prevent the wax from spreading while the form is pressed in it, and also to facilitate the operation of "backing." If there are several pages in a form, separate them by two guards; one guard does not give sufficient room to saw between the pages and leave enough of the bearer to protect the edges of the plate in shaving. When the matter occupies but a portion of a page, or the lines are shorter than the full width of the page, as in poetry, an *em* dash or a letter should be placed bottom up in each corner of the page, as a guide for the finisher in trimming the plate. When the folio is at one corner, that will answer for one of the guides.

All large blanks, chapter heads, and lines unprotected by other matter should have type-high bearers, so placed as to guard the exposed parts from injury.

LOCKING UP.

If, while trying to plane down and lock up a form, the spaces and leads are found to rise to a level with the face of the type, it is a sure indication that either the matter was not properly justified, the guards or rules bind so as to cause some parts of the form to be tighter than other parts, or the chase, furniture, or quoins are not square and true.

Use plenty of quoins, and lock forms much tighter than for printing, for, in order that the mould shall be perfect, the wax must enter and fill solidly all the interstices of the form. To accomplish this requires a very great pressure, and the movement of the wax caused by the entering of the type in taking the

mould is very likely to displace any portions of the form that may be at all loose—sometimes the spread of the wax being sufficient to bend rules or break small type in exposed situations.

Forms containing curved lines should be filled solid to the shoulder of the type with plaster.

It must not be supposed that because a proof, taken when the quoins are merely pressed up with the fingers, shows the lines to be straight and the form square and true, that it will be so when tightly locked. A proof should always be taken after the form is locked up for the foundry, and both form and proof examined, to make sure that no part has moved from its proper place in driving the quoins. Place a quoin under one side of the chase, and by pressing forcibly on different portions of the form with the thumb, ascertain whether there are any loose spots; if so, they must be made tight, or the wax will be likely to be forced between and separate the lines, or else when drawing the mould it will pull the loose type out of the form. Crooked lines in plates, and pied forms, are almost invariably due to lack of knowledge or care on the part of the compositor.

Sometimes matter is set with high spaces but low leads, or high leads but low spaces, or low spaces but no leads—one portion of a form high spaces and another portion low spaces; frequently copper-faced and white-faced type are used in the same form. None of these combinations should be allowed, but the whole form should be either high spaces and high leads, or low spaces and low leads. A satisfactory plate, for fine printing, from a form set with low spaces and no leads, or with low spaces and high leads, is a result that may be hoped for, but rarely, if ever, realized, unless the type is large.

In offices having no high quads, etc., low material must be used, but greater care is necessary in preparing the form, more labor is required of the electrotyper, and the plate is usually much less satisfactory than when high material is used.

Wood-cuts are locked up in the same way as type, but, before black-leading, they must be perfectly cleaned with naphtha or benzine from the ink which is commonly adhering to them, and dried thoroughly. Great care must be taken that no particles of black-lead clog the fine lines of the engraving, as very much depends upon the preparation of the form for moulding. Where cuts and type are in the same form together, the cuts, of course, if they be low, must be brought up to exact type height by proper underlaying.

Avoid using electrotype cuts to make duplicates from, as a much better mould can generally be made from the wood-cut.

Always send to the electrotyper with a form or cut, a clean proof of the same.

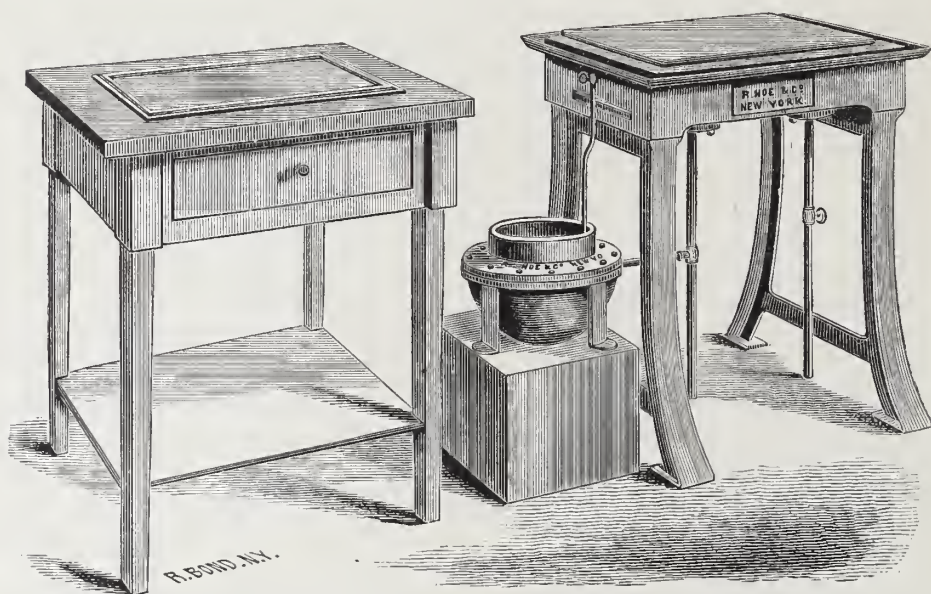
CORRECTION MATTER.

When necessary to make alterations in plates, the matter for the corrections should be set up and electrotyped; but the compositor should separate each correction by a space of about a pica, in order that there may be room to saw between them. If the alteration is but a single letter or short word, it is customary to solder the type in the plate. Should the correction require more,

or less, room than the matter to be cut away, the whole line, or several lines, should be set up, so that the spacing may be regulated.

By setting up corrections in their regular order, as far as practicable, and marking proofs distinctly, the labor and cost of plate alterations may frequently be very much reduced.

A due attention to the foregoing hints will be of material advantage to the compositor, the electrotyper, and the printer.



Iron-Topped Case-Filling Table ; Wax Kettle and Steam Heating Table.

Prices of Iron Case-Filling Tables.

No.		Price.	No.		Price.
3	For No. 1 to No. 3 case	\$27.50	7	For No. 6 to No. 7 case	\$
5	For No. 4 to No. 5 case	37.50			

Prices of Steam Heating Tables.

No.		Price.	No.		Price.
3	For No. 1 to No. 3 case	\$55.00	7	For No. 6 to No. 7 case	\$
5	For No. 4 to No. 5 case	72.00		Pipe and connections extra.	

Prices of Iron Steam Wax Kettles.

	Price.		Price.
Nine-inch diameter . . .	\$25.00	Twelve-inch diameter . . .	\$30.00

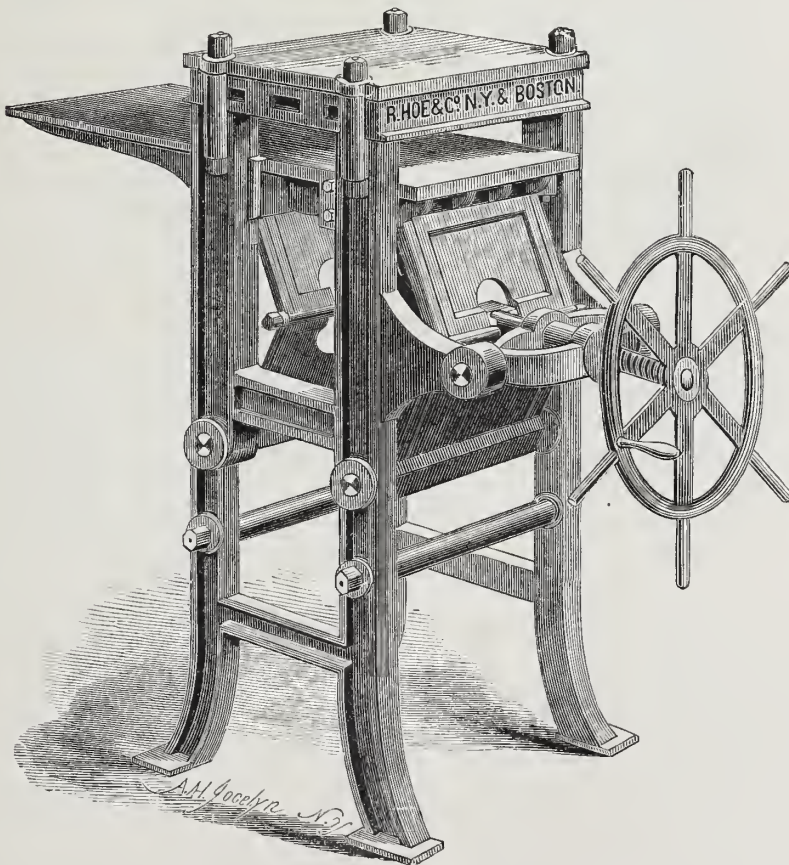
Pipe and connections extra.

WASHING.

Before black-leading the forms to prevent sticking in the wax, they should be thoroughly washed with lye or benzine if they be very dirty; with clean water if not very dirty. A rubber pipe and rose sprinkler will do this work well. They should then be dried.

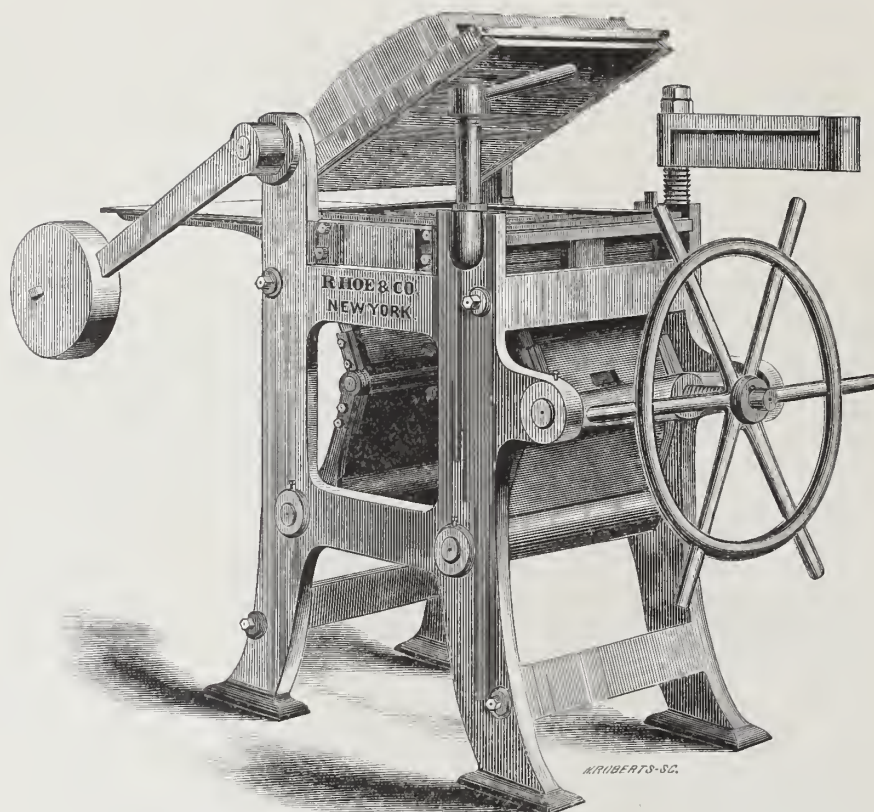
BLACK-LEADING THE FORM.

To prevent sticking of the form to the wax, its face should be very carefully and thoroughly black-leaded, the black-lead being made to penetrate every crevice. For this purpose a soft hand-brush is used. It is essential that the fine lines of the form should not be filled up with black-lead. The film allowed to remain should be practically devoid of thickness, in order that the mould may be an exact copy of the form.



Toggle Press for Electrotypes Moulds, with Fixed Head.

Price, \$325.



Toggle Press with Lifting Head, for Electrotype Moulds.

Price of Toggle Moulding Press, with Swinging Head.

	Size of matter.	Price.
Toggle moulding press, with swinging head . . .	18 × 24 inches.	\$550.00

MAKING THE MOULD.

The *moulding case* is a flat brass pan about three-sixteenths of an inch deep, with two flanges, which fit into the clamps of the moulding press. The back of the pan must be planed smooth.

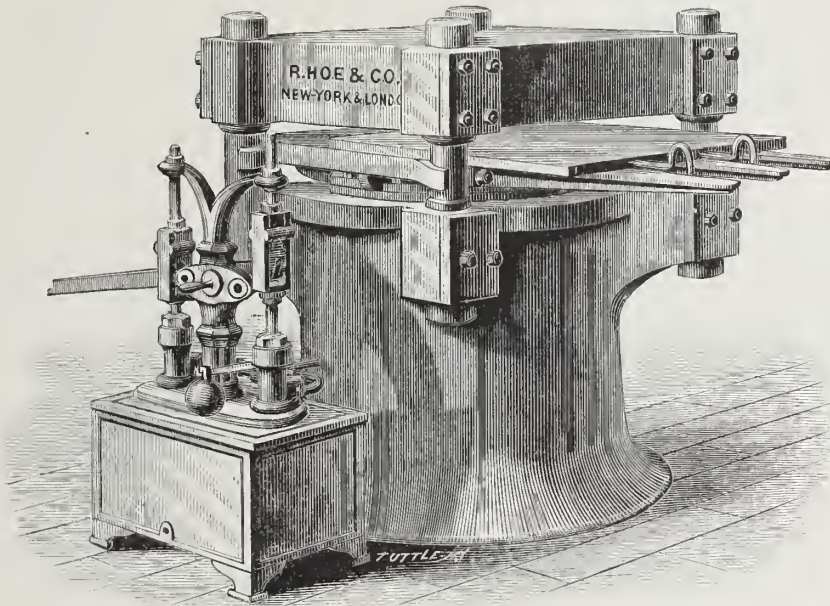
The *moulding composition* is made of the best pure yellow beeswax. In a temperature of ninety to ninety-five degrees, the wax may need no admixture; but if the room is cooler, it should be prevented from cracking by the addition of from five to twenty per cent. of virgin turpentine.

New wax should be boiled several hours before pouring into the moulding case; old wax, only long enough to evaporate all moisture. Care must be taken not to have too much heat, or the wax will be burned, and rendered quite useless. Steam is much the best for this purpose, as with it the wax is not so likely to be overheated.

FILLING THE CASE.

The moulding case, having been slightly warmed on the *steam heating table*, is placed on the level *case-filling table* and the melted wax is poured into it with a clean iron or copper ladle, great care being taken to run the wax entirely over the case while it is hot, so that it may not, by cooling too quickly in any part, cause irregularities. The air-bubbles which rise to the surface must be touched with the heated building iron, when they will disappear.

Should the wax, in cooling, shrink away from the edges of the case, it can be remelted there by running the heated iron over it, so as to close up any fissure. When the wax has become cool, it should present a smooth, even surface; otherwise, it is useless, and it is better put back into the pot and melted over again. The whole surface should now be carefully and thoroughly rubbed over with black-lead, and polished by means of the soft brush alluded to, after which the wax is ready for the impression.



Hydraulic Press for Electrotpe Moulds.

Prices of Hydraulic Moulding Presses, with Solid Heads.

	Size of matter.	Price.
Hydraulic moulding press, with solid head	21 × 28 in.	\$800.00
Hydraulic moulding press, with solid head, to work by power		
Hydraulic moulding press, with solid head, with single hand pump	24 × 32 in.	1150.00
Hydraulic moulding press, with solid head, with patent accumulator	24 × 32 in.	

THE PRESSES.

To make the impression of the form in the wax, a great and steady pressure is needed. To give this, there may be employed either a "toggle" press or a "hydraulic" press.

The "toggle" press consists, in one form, of a massive frame, having a planed bed, over which is a fixed head. There is a projecting table, on which the form and case may be arranged before sliding them in to receive the pressure, which is put upon them by raising the bed by means of the screw and two toggles.

The swinging-head toggle press has a solid frame with a planed movable bed, over which is a head, swung on pivots, and so counterbalanced that it can be readily thrown up, leaving the whole bed exposed, the black-lead case being clamped on the bed; the type form, also black-leaded, is carefully placed on the case, and the head is turned over and held down by the swinging front piece shown, turned back to the right. The toggle pressure is then put on by the hand wheel and screw shown; and the result of the combined mechanical forces, the wheel and axle, the screw and the toggle, is an enormous pressure with but little manual exertion.

THE HYDRAULIC PRESS.

The *hydraulic press* has projecting rails and a sliding plate, on which the form and case are prepared before being placed in the press. The pump, which is hand-worked, is supported by a framework on the cistern below the cylinder, and has a graduated adjustable safety-valve to give any desired pressure. As shown, it takes up a floor space of 4 ft. 6 in. \times 4 ft. 6 in., and takes in a form 24 \times 32 inches. The maximum pressure which it exerts is 80 tons. It may be arranged to be worked by power.

The exact depth of impression can be attained only by practice.

THE CLOTH.

Where low spaces are used, it is customary to make a preliminary impression with a thin sheet of gum cloth interposed; this is then removed and the pressure put on again. Where the cloth is not used, it is necessary to shave off, with a wide, thin knife, the projecting wax ridges.

Where the form is large, but one impression is taken in the wax, but small ones may be applied several times, shifting them over the surface.

REMOVING THE FORM.

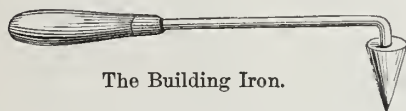
Where the swinging head is not used, should the form stick in the wax, it may be relieved by touching the chase gently in two or three places with a long screw-driver, so as not to break the face of the wax. When once the form or engraving is withdrawn from the wax, after making a final impression, it must not be reëntered, as it probably would not go exactly into the same place

again, and the impression would be rough. Now remove the case from the clamps and place it upon a table ready for the process of

BUILDING.

This operation requires skill and a steady hand. A well-built mould will save a great deal of trouble in the stages which follow, as the object is to obviate, as much as possible, the necessity of chiselling the plates. Wax is run or built on the places where blanks are to be. This building is performed with

THE BUILDING IRON,



The Building Iron.

Price, \$3.50.

which is heated and applied to a strip of wax, melting it and causing it to flow down from the point of the iron on to the blanks of the mould. This process cannot be easily taught; but it must be acquired by careful practice.

The great difficulty is, to prevent the wax from running where it is not required. A quick eye and steady hand will do this.

BUILDING WAX.

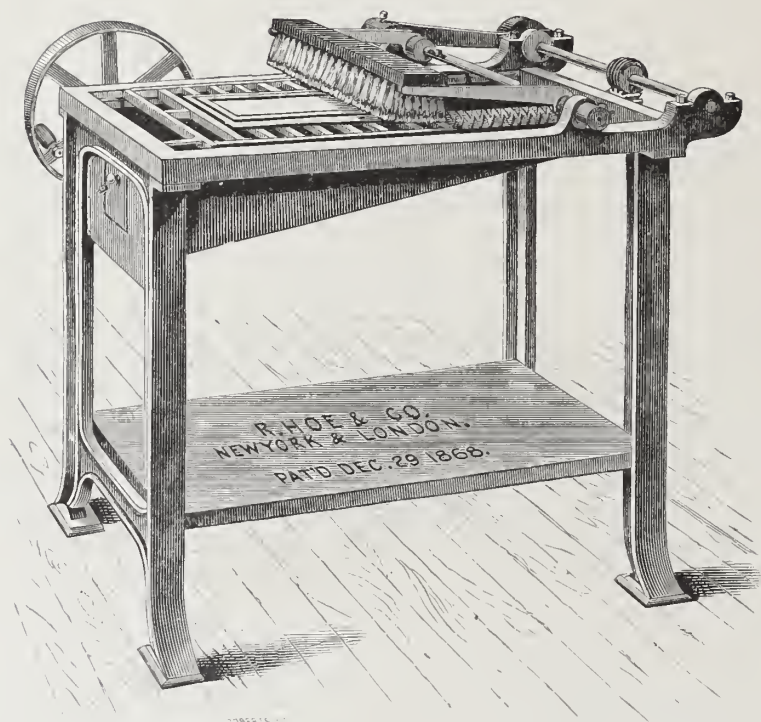
The wax used in building should be cut in strips eight to ten inches long, five-eighths wide, three-eighths thick, and must be kept perfectly dry. If any portion gets damp, it is best not to use it for building purposes, as there is danger of its spattering over the mould. The building iron must not be too hot.

BLACK-LEADING AND COATING THE MOULD.

After the wax mould is properly built, it is ready for black-leading, which is necessary to give it a conducting surface and cause the copper to be gradually deposited over every part of it.

Black-lead for this purpose must be absolutely pure, with a bright lustre, free from grit, and very fine.* If it is inferior and dead-looking, it is worse than useless. It should be thoroughly worked into every letter and line, or it is useless to put the mould into the precipitating cell or vat, for the copper will not be deposited perfectly over its surface.

* The purest selected Ceylon lumps should be pulverized by rolling with heavy iron balls, which make it an infinitely fine powder, instead of scales. It should be pulverized until the particles will not glisten, but the mass becomes a dead black. It should be separated by air floating, or by floating in a bath of dilute sulphuric acid, which will take up the particles of spar and iron, leaving the sulphates of lime, magnesia, and iron easily washed out.



Black-Leading Machine.

Sizes and Prices of Black-Leading Machines.

No.	Size of matter.	Price.	No.	Size of matter.	Price.
4 . .	15 × 20 inches . .	\$175.00	7 . .	24 × 32 inches . .	\$250.00
5 . .	18 × 24 inches . .	200.00	Apparatus for steam power,		30.00

BLACK-LEADING THE MOULDS.

This operation has for its object the covering of the non-conducting wax with a conducting surface on which the copper film will deposit readily, but to which it shall not adhere. Naturally, black-leading the moulds requires better material and greater care than was required to prevent the forms sticking in the wax. To effect it, either a hand brush or a machine may be used.

When a brush is used, it should have a large and thick body of short hairs.

Above is shown a black-leading machine, with its cover removed.

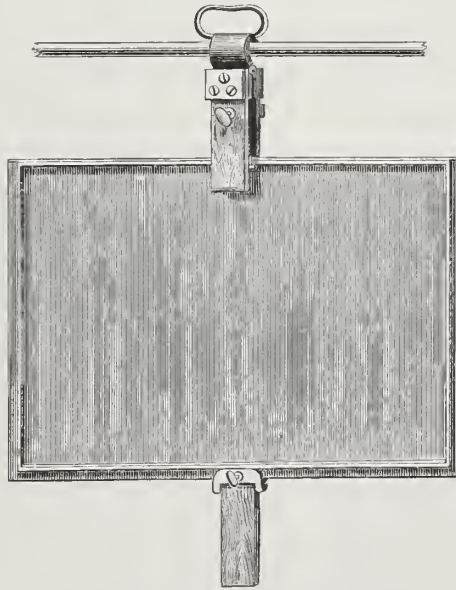
It has a travelling carriage holding one or more forms, and passing backward and forward under a laterally vibrating brush. A case 12 × 28 inches can be leaded in two minutes. An apron under the machine catches the powder and prevents waste.

After this operation has been thoroughly performed, the superfluous graphite must be blown out of the lines of the mould by a flat-nosed bellows, or brushed out, so that the thickness of the graphite film shall be as nearly nothing as possible, and thus insure clean, sharp, fine lines.

The dry black-leading machine, just described, has the disadvantage of being comparatively wasteful of graphite, causing great dirt in the room, and being unhealthful to the operators; furthermore, a form black-leaded with dry powder is apt to repel the liquid in the bath, by reason of clods clinging in bubbles. Where the dry process is employed, the superfluous graphite must be blown out by a broad-nosed bellows,—not a loose particle being allowed to remain; or, the copper being deposited over it, a rough and faulty electrotpe will result. The mould, held to the light, should reflect it from all parts of its polished face.

The *wet process*, the invention of Mr. Silas P. Knight, the chief of the electrotyping department of Messrs. Harper Bros., New-York, is designed to work more quickly and neatly, producing moulds that are thinly, evenly, and perfectly covered, not omitting the dot to an *i*, nor allowing “bridging” over fine lines.

There is a chest provided with a shelf, on which the moulds are placed; and a rotary pump forces an emulsion of graphite and water, through a travelling fine-rose nozzle, over the moulds. The capacity, neatness, economy, and effectiveness of this machine deserve high commendation.



Moulding Case, with Patent Electric Connection Gripper.

Price, \$



STOPPING.

The back and edges of the moulding case must be coated with hot wax after it is black-leaded, to prevent the copper forming upon it. To prevent the deposit of copper on any places where it is not wanted, the hot building iron is run over them, so as to destroy the continuity of the black-lead surface, and leave a non-conducting wax face.

THE NUCLEUS.

The black-lead being a poorer conductor than metal, and its whole surface not being in the current at once, it is necessary to have some nucleus of metal on which the copper deposit may commence. This is sometimes provided by removing the wax from the rim of the brass case—if the “connection gripper” be not used; on this the deposit will gradually begin, and spread over the whole surface of the wax. Another way is to fasten a piece of metal to the wax at the top of the mould, and connect it with the metal by a copper wire, perfectly clean, wound around the connecting rod.

PATENT ELECTRIC CONNECTION GRIPPER.

This is made to hold and sustain the moulding case, and at the same time to make an electric connection with the prepared conducting face of the mould only; consequently leaving the metal case itself entirely out of the current of electricity, so that no copper can be precipitated on it. This prevents the necessity of plastering hot wax on the back and edges of the case before immersion in the precipitating cell, and also saves the time expended in removing the wax from its back before it can be used again. It is simple and easy to manage.

COPPERING, SILVERING, GILDING, ETC.

The conducting power of black-lead is greatly improved by gilding or silvering, or by mixing with one-third its weight of finest white bronze powder.

Gilding powder is made of one part of chloride of gold dissolved in 100 of sulphuric ether, and added to 50 of plumbago; mix, expose in a can to sunlight, stirring until dry; apply by brushing.

Coppering. By a simple and ingenious patented device of Mr. S. P. Knight, the mould may be at once coated with a thin film of copper, to cause uniform deposition over its entire face. The graphited wax mould being dusted from a pepper-box with impalpably fine iron-filings, which are in some cases brushed, is next sprinkled with a solution of sulphate of copper (blue vitriol), which causes the precipitation of pure metallic copper over the entire mould. Should any portion remain uncoppered, the operation must be repeated. The excess is washed off, and the mould is then ready for the bath.

Some establishments reverse this operation; first pouring the solution of sulphate on the mould, and then dusting with the iron filings; stating that the first method may wash off some of the filings.

THE ADAMS PROCESS FOR COVERING MOULDS WITH A METALLIC SURFACE.

This process, patented in 1870, gives a perfect surface with more certainty and rapidity than any other.

While the wax is still warm in the moulding case, apply finely powdered tin with a soft brush until the surface presents a bright, metallic appearance. Then brush off superfluous powder.

The form of type or wood-cut is first coated with black-lead, to insure the separation of the mould from it, and an impression is taken in the wax.

Build up and connect the mould in the usual manner. Then brush tin powder over it by hand or machine, and, after blowing out, touch with a hot block building iron all parts of the mould on which the copper is not to be precipitated.

Immerse it in alcohol, then wash with water to remove the air from the surface, and it is ready to be suspended in a solution, which should be made as follows :

Fill a precipitating cell nearly full with water, keeping an account of the number of gallons poured in ; hang a bag of sulphate of copper crystals in the top of it until the water is saturated ; for every gallon of water add from a half-pint to three gills of sulphuric acid, and mix the whole thoroughly.

In this solution hang a sheet of copper, connecting it with the negative plates of the battery, and when the solution becomes cool and settled, immerse the mould and connect it with the positive or zinc pole of the battery, when the surface of the mould will be quickly covered with thin copper. Then remove for completion to another and larger precipitating cell, containing a solution made in the proportion of one pound of sulphate of copper and one gill of sulphuric acid to each gallon of water.

If sulphate of copper crystals form on the copper plate in the first precipitating trough, detach it and dissolve them off, substituting for it a clean plate.

When the solution in the first precipitating cell has become nearly saturated with tin, which will happen after a long time, it should be thrown away and replaced with fresh.

This process of using a metallic powder in connection with black-lead, or in place of it, accomplishes in a few minutes what, with black-lead alone, requires from two to four hours.

DIRECTIONS FOR THE USE OF TIN POWDER, WITHOUT CHANGING THE MOULD FROM ONE SOLUTION TO ANOTHER.

Black-lead the face of the wax mould while still warm, and prepare the form of type or wood-cut with black-lead in the usual way.

After the mould has received all the desired impressions, remove it to the black-lead table, and hold it face downward, one end resting on the table, the other supported by the hand. Then, with a piece of board, strike it on the back several times to loosen the black-lead that is pressed on the wax while

moulding, and blow off with a bellows all the fine dust that may yet cling to the mould.

When built-up and connections all made, place it in the machine, or hand case, and use the tin powder in the same manner that black-lead is used. It will not require longer to apply it, either by hand or by machine, than it does black-lead.

Both the machine and the hand case should be kept free from black lead, employing only tin powder for metallizing the face of moulds. If the machine is used, place the mould or moulds on the carriage, cover well over with tin powder, close the door, and run once forward and backward under the vibrating brush; then turn the moulds around, put on more tin powder, and run through again. It will take three minutes for the whole operation. On the table used for tin powder, beat the tin powder out of the mould as before directed, then blow it out most thoroughly. It is then ready to be painted with wax, which should be kept very hot. A practical workman in that branch can coat the back and sides of cases rapidly, and also blot out on the outer edges of the face those parts not to be deposited over, and do it much quicker than with a building iron.

STOPPING OFF,

For prevention of the deposit in certain places, is effected by the building iron as just described, or by varnish, alcoholic solution of sealing wax, or any other non-conductor.

QUICKING.

To prevent the copper deposit being broken over lines in set-up type, the lines may be wetted with a "quicking" liquid (say a dilute solution of nitrate of mercury), and deposited upon again.

The nitrate quicking solution is made by adding one ounce of mercury to sufficient nitric acid, and diluted with three times its bulk of distilled water, to dissolve it; then add one gallon distilled water.

Cyanide quicking solution is made by dissolving almost any salt of mercury in a solution of cyanide of potassium.

Quicking solution should contain only enough dissolved mercury to make the upper surface white in a few seconds. It should be used very sparingly.

DISPELLING THE AIR.

To dispel the film of air which forms on the surface of the black-leaded wax *when the dry process is used*, before placing in the precipitating cell, lay the case in an inclined shallow tin pan, and pour alcohol over it, beginning at the upper side. Then place the case on its back in a shallow trough, and force water on it by a pump through a flexible tube, taking care that the water thoroughly penetrates the cavities and forces out the air-bubbles which adhere so tenaciously. The mould should now be taken out and quickly placed in the precipitating cell.

DEPOSITING.

THE BATTERY.

For some time after the invention of electrotyping, first Daniell's and then Smee's batteries were generally used. The plates of the latter extended nearly the whole depth of the glass acid cells; and when the heavy sulphate of zinc formed, it fell directly to the bottom of the vessel, saturating the solution about the lower part of the plates, and, so far up as it gradually extended, the action of the battery was nearly all lost. To overcome this difficulty, Mr. Adams, in 1841, arranged a battery with zinc and Smee's platinized platina plates, extending to but one-third the depth of the vessel, and by this means secured a full current and equal action of the battery for a much longer time before it was exhausted of its acid. This form of battery is now in general use, having superseded all other kinds.

Copper plates, silver plated and platinized, are still used to a great extent, because their first cost is less than that of plates of platinized platina or silver. These copper plates, however, are liable to be oxidized, and the oxide of copper being taken up in the acid solution, and precipitated on the platinized surface of the plates, will greatly weaken the electrical current. Platinized platina or silver plates, although expensive at first, are cheapest in the end, and work better in the battery; are not so liable to get foul, and are much more easily cleaned.

All batteries may be divided into two classes: those which require only one solution, and those requiring more than one. To the first class belong the Smee, Wollaston, etc.; to the second class the Bunsen, Daniell, Leclanché, etc.



SINGLE-SOLUTION BATTERIES.

THE SMEE BATTERY.

It consists of a triple arrangement of amalgamated zinc and platinized silver plates, immersed in a solution of sulphuric acid perfectly free from nitric acid.

The silver plate is fixed in a bar of wood, which is laid across the top of the jar; the zinc strips are clamped on each side of the silver by means of a binding screw; a piece of cork or wood should be placed between each two plates at the lower end, to keep them from coming in contact.

Platinized silver gives less foothold to the hydrogen bubbles, and at the same time produces a much stronger current than silver alone.

The Smee battery is adapted to light work, where a very heavy current is not required.

THE WOLLASTON BATTERY.

In the Wollaston battery, the metals employed are copper and zinc, with a solution of one part of sulphuric acid (oil of vitriol) to ten parts of water.

A stone jar is nearly filled with this solution, and covered with a varnished board having three slits cut in it for the plates to slide through.

The copper plates are joined by a copper band, forming an arch, which serves as a connection and may be used as a handle to withdraw the plates.

A handle should be made to the zinc plate, by passing a cord through a hole in the top.

By regulating the amount of the zinc surface immersed, the current may be increased or diminished at will.

When not in use the plates should be withdrawn, as cupric sulphate is formed, which dissolves and attacks the zinc, precipitating the copper on itself.

The copper, after having been in use some time, becomes coated with a black oxide of copper, which should be scrubbed off, as it impairs the action, lessening the strength of the battery.

New sulphuric acid should be added from time to time, to keep the strength of the battery uniform.

THE BUNSEN BATTERY.

This consists of a stone jar filled with a solution of sulphuric acid, in which is placed a porous jar containing nitric acid. The + element is a cylinder of coke, which is put in the porous cylinder. The negative element—a sheet of amalgamated zinc, bent in the form of a cylinder, with a slot left between the two ends—stands in the sulphuric acid, and surrounds the porous jar.

The nitric acid is apt, by capillarity, to rise through the coke and corrode the connections. This may be avoided by dipping the upper end of the coke (which remains out of the liquid) in paraffine, coal tar, or shellac.

Condit, Hanson & Van Winkle have an improved Bunsen battery, made up of two six-quart cells, capable of running one hundred gallons of nickel solution.

The single cell of the battery is complete in four pieces, viz.: a glass bath; a zinc plate, bent into the form of the bath; a porous cup; and a carbon strip.

The solution used in the outer bath is the usual twelve-ounce solution of oil of vitriol and water—oil of vitriol, one part; water, twelve parts. In the porous cup, the solution is equal parts of oil of vitriol and water, with the addition of two ounces of nitric acid.

Strips of glass should be placed between the zinc and the porous cup, to prevent contact.

When the outer liquid becomes milky from use, it should be thrown away, and new solution substituted.

The intensity of this battery may be increased by using nitric acid saturated with bichromate of potash, in the porous cup; or a solution of oil of

vitriol, diluted in three parts of water, to which has been added twelve ounces of bichromate of potash, dissolved in the same amount of hot water.

DANIELL'S BATTERY.

This is one of the most commonly used, on account of the regularity of its current and the length of time it runs without renewing.

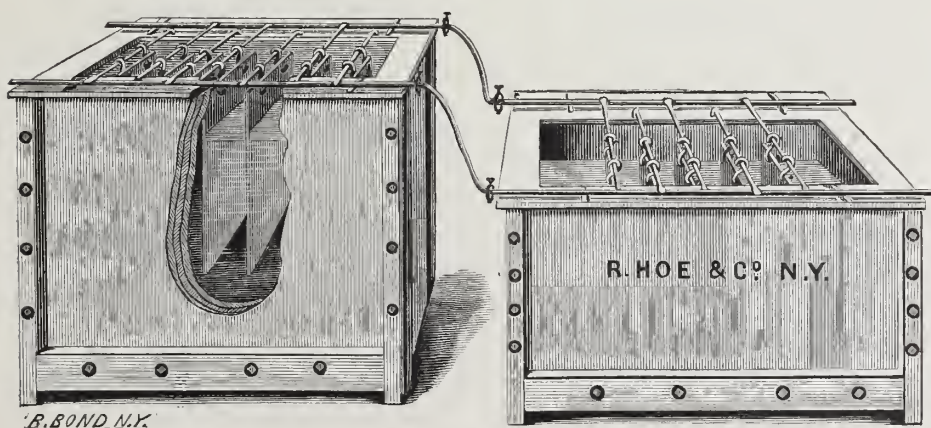
One variety consists of a copper jar filled with a nearly saturated solution of sulphate of copper, in which is stood a porous vessel filled with dilute sulphuric acid, containing a bar of zinc. On a little shelf in the copper vessel are placed a few crystals of blue vitriol, to supply the loss from copper deposited.

A stone containing-vessel may be substituted for the copper one, and copper plates used in the solution of sulphate of copper to supply its place.

THE LECLANCHÉ BATTERY.

A carbon plate standing in a porous vessel is filled around with a mixture of the needle variety of peroxide of manganese and gas-retort carbon. An outside vessel containing sal ammoniac contains the zinc rod which forms the + pole.

It is estimated that twenty-five cells of this battery equal forty of Daniell's. This battery is constructed to avoid leaking and prevent destruction of the wooden vessel by the acids in use in the battery, against the action of which coal tar, paraffine, varnishes, etc., are ineffective. It is lined with thick glass, united at the joints; and leakage is guarded against by cement and a filling of an insoluble hydrocarbon substance.



Patent Battery for Electrotypes, lined with Glass. (R. Hoe & Co.)

Price, \$

MANAGEMENT OF THE BATTERY.

If the acid liquid in contact with the zincs be very strong, they require frequent watching to see that there is no local action. When gas is seen or heard rising from them, or when dull patches appear upon them, when the acid has acted too strongly, they should be re-amalgamated, else holes will be corroded in them. Unless deposition be desired all night, take them out of the cells every evening, if the acid be at all strong.

Wollaston's, Smee's, and Daniell's batteries, after a few days' work, need to have a little sulphuric acid stirred in, as the current gets feeble. When the liquid gets oily, and zinc salt crystallizes on the cells and plates, above the surface of the liquid, it is time to recharge.

Deposit of zinc on Smee or Wollaston negative plates shows that the acid is exhausted. Dilute sulphuric acid in a separate vessel removes the deposit.

In Grove's and Bunsen's batteries, nitric acid should not be allowed to touch the zinc, as it wastes it. These porous cells should be regularly soaked in water, and two or three sets kept on hand, one always in soak.

In "two liquid" batteries the liquid should be kept at the same level, or if any difference be made in Grove's, Bunsen's, or Daniell's, the zinc liquid should be the higher.

Motion of the copper solution is advantageous.

Too great a current causes deposition of metal in brown or nearly black powder, and sometimes streaks and variation in thickness of deposit.

Too little water causes crystals of sulphate of copper to form on the anode, and sometimes even on the cathode, and upon the bottom of the vessel.

Too much acid corrodes the anode while the current is passing.

A trace of bisulphide of carbon in the sulphate solution causes brittle deposit.

If the battery have too little work to do, the deposit will be a dark powder. If it have too much work, there will be a red, brittle deposit, or crystals.

To remedy the first trouble, pour out some of the battery solution, or partially raise the plate, or interpose a finer wire between battery and mould.

FREQUENCY OF CHANGING SOLUTION AND AMALGAMATING ZINCS.

It is best to renew the battery solution every twenty-four hours, as the second twenty-four hours do not give, without renewal, above half the deposit of the first, while the waste of zinc is nearly as much.

AMALGAMATING.

Zinc plates are always amalgamated, because (1) it makes them more electro-positive; and (2) it largely protects them from corrosion when the battery is not in action.

New plates are probably greasy from rolling, and should be dipped in caustic potash solution before putting in the acid, or they should be scraped. New zincs require frequent amalgamating, because the mercury soaks into them.

TO AMALGAMATE ZINC PLATES.

Immerse them in the acid bath until gas is freely evolved; then rub pure mercury well into them with a hard brush; stand them up long enough to let the superfluous quicksilver run off, and they will be ready for the battery.

Another plan is to put some mercury in a coarse flannel bag; dip the bag occasionally into dilute muriatic acid, and rub it upon the zinc plate or rod.

As compared with stereotyping, the advantages of electrotyping are that the metal is harder, the impression sharper, and the ink delivery more rapid than from type metal. It is also a cleaner process; the plates take up less ink, and the printed pages dry more quickly.

A mould of electrotype copper of the London *Times* is said to have furnished twenty million copies before worn out.

The dynamo-electric machine, sometimes incorrectly known as the "steam battery," is a device for the conversion of mechanical into electrical energy. It is not a "generator," but a "converter." There are many forms of them, any of which we can furnish.

CONDUCTORS AND CONNECTIONS.

Copper has conducting powers almost equal to those of silver (99.9 to 100.0)—iron being 16.8 and graphite 0.069. Being cheap, very flexible, and ductile, easily obtainable, and not readily oxidized, it is nearly always employed in electro-metallurgy for transmitting currents.

Arsenic in copper is very injurious to its conductivity, lessening it, sometimes, as much as sixty-six per cent.; one-half per cent. of iron lessens it twenty-five per cent.

A rise in temperature from zero to one hundred degrees centigrade decreases conductivity of most metals thirty per cent. But liquids conduct best when warm.

As electric currents produce heat in overcoming resistance, it follows that if the conductors, or connections, be insufficient, they will become heated, and have their conductivity lessened still further.

The strips of sheet copper forming the connection between the battery and the precipitating trough should be of sufficient width to conduct a plentiful current of electricity; in fact, it is better to have them larger than is actually required.

The rods, hooks, and all connections, on both battery and precipitating trough, should be kept well cleaned with emery or sand-paper.

The copper straps from the dynamo machine are generally continued, each along one side of the depositing tank, and brass rods extended across them, one end of each rod being insulated by a piece of India-rubber tubing.

RESISTANCE COIL, OR SWITCH.

One of the nicest and simplest of the many pieces of electrotypers' gilders apparatus, placed on the market by Condit, Hanson & Co., recommended for

its efficiency, simplicity, and cheapness, is the resistance coil, or switch, enabling the operator to regulate the current to a fine nicety, thus doing away altogether with the more complex method of attaching and disconnecting batteries. By putting the key on the pin marked *strong*, the greatest current the battery will give is obtained; by moving the key toward the pin marked *weak*, we have a gradual lessening of the current until we arrive at the minimum.

GETTING READY.

Before the moulds are placed in solution, the battery must first be put in order, ready for work. See that the connections are perfectly clean, test the working condition with each copper plate separately, and, if everything is right, wash out the moulds. When a sufficient force of water for this purpose cannot be had in the electrotype room, a double-acting pump should be used, with a rubber hose and pipe, but without a sprinkler. Put the mould about four inches under water, hold the nozzle about one inch below the surface of the water, and have the pump worked at a speed of thirty strokes per minute, directing the jet of water four different ways over the mould. Great care must be used in this operation, as any neglect may cause defects in the shell, it being indispensable that every part of the mould be thoroughly washed out.

CONNECTING.

Now place the mould immediately in the precipitating solution, and quickly connect with the battery. If there be ten or twenty moulds, let the first one placed in solution face the copper plate farthest from the battery, and so in regular order until the last one is nearest to the battery trough. Every mould must be connected as soon as put in, and remain until finished.

COPPER SOLUTION.

Suspend in the upper part of a vessel of water, sulphate of copper held in linen bags. When the salt of copper has dissolved for some time, stir the solution well with a wooden paddle, and test it with an hydrometer, such as are used for liquids heavier than water. When it indicates a density of about ten or twelve, the bags of blue vitriol must be taken out, and sulphuric acid added, which should also be well stirred up, until a density of about fourteen to sixteen by hydrometer is attained. (These proportions are for medium temperature; if colder or warmer, they must be varied to suit the temperature. More blue vitriol should be added for the hottest period of summer, and more acid and water for the extremely cold days of winter.) Occasionally, water must be added to make up for the evaporation that takes place.

Every day, immediately after taking out the shells or moulds, stir up the solution thoroughly, to allow time for the sediment to settle, so that the solution will be perfectly clear before putting in the new moulds, in the after part of the day. This stirring up will also equalize the density of the solution, which

would otherwise become lighter at the top and heavier at the bottom; consequently the copper shell in that case would be correspondingly thick and thin.

On trial, should the battery not work freely and well, add a little more acid; if it works too freely, it will be necessary to take out some of the plates.

The copper plates get eaten off at the line of immersion. The piece which remains may be utilized by simply bending it double, and hanging it over the edge of the new plate.

REVERSING DEPOSITS.

Plates which have been used, or spoiled plates, may be utilized by employing them instead of new anodes—hanging them with the copper face opposite the moulds. The copper is stripped off by the battery, and deposited on the moulds, the white metal remaining inert.

THE SHELLS.

THICKNESS OF SHELL.

For ordinary book or job work, the copper shell should be about as thick as good book paper—say about three to four hours in the bath. For newspaper headings and such other blocks as have excessive use, the shell should be very thick—say two to three days' deposit.

REMOVING THE SHELL.

Place the mould in an inclined position; liberate all the connections; take hold of one corner of the shell, and from a pitcher of hot water pour from the top of the shell across the mould, carefully, yet quickly, lifting up the shell as the hot water flows over it. The removal of the shell from the wax should be done carefully, so as to keep it straight; if not, it will be difficult to perform the backing properly, and make the "plate" a uniform height.

In taking the shell from the mould, a thin film of wax adheres to the copper; the quantity remaining on the shell depends a great deal on the expertness of the operator; but the less wax left the better. In order to remove all the wax from the copper, it is well to wash it with a saturated solution of common potash dissolved in water. This solution is made as follows: Drop potash into water, so long as the water will dissolve it; pour the solution into a two-gallon iron pot, and place it on the fire. When hot, take the copper shell, lay it on a shovel or gridiron, and pour the hot potash over it until the wax is all dissolved and disappears, allowing the potash to run again into the pot, which should have around it a sheet-iron apron slanting down to the edge of the pot; then rinse the shell thoroughly in cold water.

It is necessary to remove all of the wax to prevent its taking fire during

the process of tinning, in which case it would leave a hard crust of carbon. The shell should now be perfect in every way, and clean. The next manipulation performed with it is called tinning the shell.

TINNING THE SHELL.

Tin has a great affinity for copper, and serves to unite the shell and the backing metal, which would otherwise separate in finishing. The process of tinning is very simple. Ordinary "soldering solution" is first prepared in a wide-mouthed quart bottle, by pouring in about a pint of muriatic (hydrochloric) acid, and dropping in some pieces of unamalgamated zinc, to which, when no more gas is given off, should be added one-third water, with a half-ounce of sal ammoniac dissolved in it.

Place the shell face downward in the backing pan, and brush over the back of it with this solution; then spread alloyed tin-foil over it, and float the pan on the hot backing metal until the foil melts and completely covers the whole shell.

When melted solder instead of alloyed tin-foil is used, the shell, after being brushed with the soldering solution, is transferred to the furnace, laid on a float face downward, and the molten solder poured thereon. This process is repeated, in order to insure the thorough tinning of the whole surface.

Formerly the shell was held upon a shovel or gridiron as nearly perpendicular as possible, and the hot solder poured upon it, beginning at the upper edge, and allowing it to run into the pot again. If there were any minute holes in the shell, the solder would follow the acid and run through them, and the face as well as the back would be tinned, and the shell ruined. The shell was liable to get warped in this pouring process, and unless it laid perfectly flat in the backing pan, it was impossible to produce a perfect electrotype plate, and the operator had the chagrin of receiving it back from the printer.

STEAM MELTING TABLE.

After the shell has been removed from the wax mould, the case is placed upon the steam melting table and the wax melted out, leaving the cases clean, ready to be used again, and thus saving much time and labor.

BACKING, FINISHING, AND BLOCKING.

BACKING.

When the foil has melted, swing the backing pan on the levelling stand, and with an iron ladle pour the melted metal carefully on the shell, commencing at one of the corners and gradually running it over the whole until it is of sufficient thickness. The experienced eye will at once see when enough has flowed over it. While it is cooling, another shell can be got ready.

BACKING PAN AND STAND.

The top of the stand should be made perfectly level, and then screwed fast to the floor by the feet. In this way the metal, when poured over the tinned shell, will be of uniform thickness throughout. As floors sink unevenly, the surface of the stand should be tested from time to time with a level—say every three months.



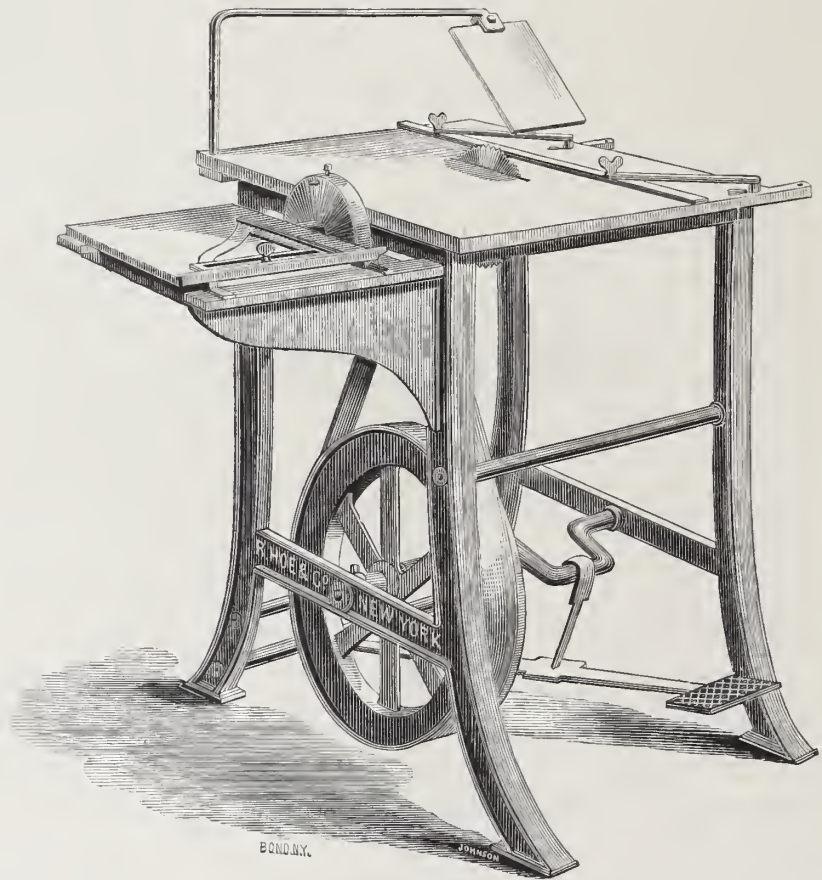
Backing Pan and Stand.

Sizes and Prices of Backing Pan.

No.	Size of matter.	Price.	No.	Size of matter.	Price.
1 . .	6 × 9 inches . .	\$10.00	5 . .	18 × 24 inches . .	\$28.00
2 . .	9 × 12 inches . .	13.00	6 . .	21 × 28 inches . .	34.00
3 . .	12 × 16 inches . .	17.00	7 . .	24 × 32 inches . .	40.00
4 . .	15 × 20 inches . .	22.00			

Sizes and Prices of Stands for Backing Pan.

No.	Price.	No.	Price.
3 For No. 1 to No. 3 pan .	\$12.00	7 For No. 6 to No. 7 pan .	\$18.00
5 For No. 4 to No. 5 pan .	15.00		



Saw Table.

The mandrel is of steel, driven by a treadle, the heavy fly-wheel having the momentum sufficient to carry the saw through the work. This wheel is so balanced as to stand with the treadle always raised from the floor, in a position to start. The saw can be sharpened in place by pressing a wooden wedge beside it into the slit in which it runs. A glass protects the eyes from chips. For running by power, the fly-wheel and cranked shaft are replaced by an ordinary pulley, and a straight shaft having tight and loose pulleys on its outer end. When so ordered, a cutter-head is put on the outer end of the mandrel, with a small sliding table outside of it, as represented in the cut, for squaring up metal blocks, etc. A parallel gauge and square furnished when ordered.

Price of Iron Saw Table and Saw, with Parallel Gauge and Square.

To work by foot or steam power	\$200.00
Outside cutter for squaring up, and sliding table, extra	80.00

BACKING METAL.

It has been found very difficult to make a backing metal which will not separate from the shell in the process of finishing the plate. Antimony has a great affinity for tin, and, if greatly in excess, will absorb so much as to leave the shell partly stripped of it; but when the proportion is correct, there will be no trouble.

The following has been found a very good composition :

Tin	4 parts.
Antimony	5 "
Lead	91 "

FINISHING.

The plates, as they come from the backer's or caster's hands, are rough on the back and of uneven thickness, there are more or less of imperfections in the letters, the blanks are higher than they should be for printing, and there are bearers which are necessary to make the plate strong enough for the operations it has to undergo, but which must be removed. All these defects it is the finisher's work to remedy.

If several pages are cast in one piece, they are first sawn apart on the proper table. Each plate is then trimmed all around to remove the rough edges, and if there are projections which would prevent its lying flat on its face, they are cut down carefully with a small chisel. The plate is then shaved, to take the roughness off the back and to make it of even thickness in all parts. In large establishments this is done with power planing machines, but till within a few years it was altogether done by hand shaving machines, as it is still in smaller shops. When done by hand it is the most laborious part of the finishing, and if the amount of work will at all justify it, the power machine is preferable.

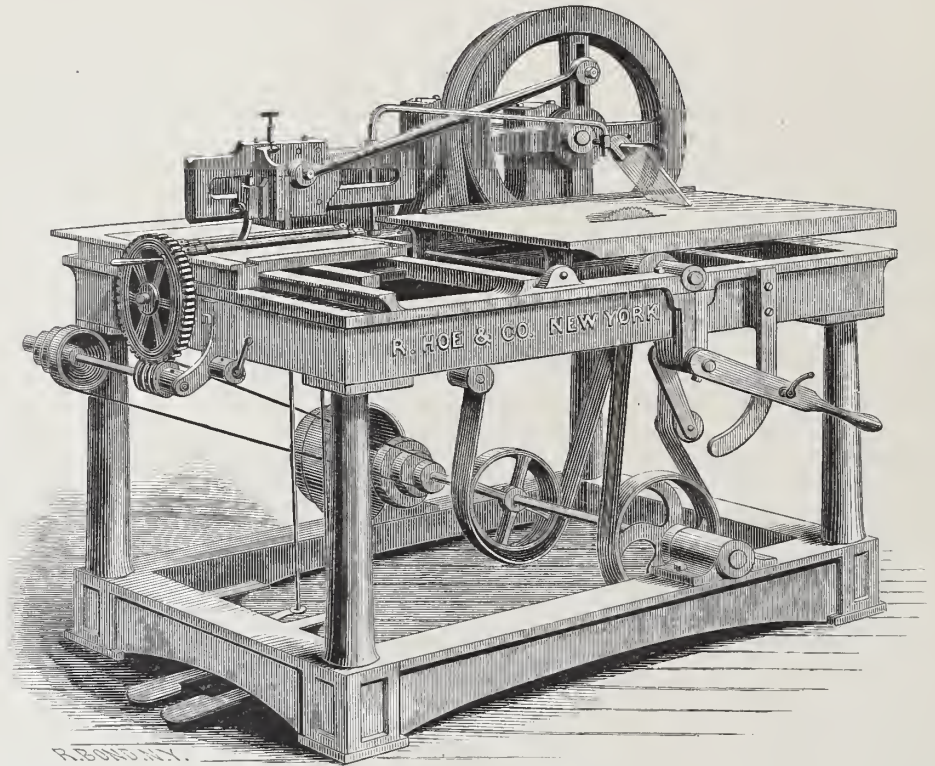
The plate, being now nearly of proper thickness, and almost true, is tested with a straight-edge on the face, and the unevennesses are beaten down with a light hammer and planer. This is preparatory to the final shaving, and is indispensable. The plate is then passed through the hand machine, accurately adjusted, and two or three light cuts are taken off.

DOUBLE-GEARED HAND SHAVING MACHINE.

For wide plates it is desirable to have a double-geared machine, such as is shown on page 106. A power machine is shown on page 125.

BRINGING UP LOW PLACES.

A proof being taken of the shaved and dressed plate, low places are brought up by laying the plate face downward on a smooth iron plate, and striking the thin place with a ball-faced hammer. The face is then tested, rubbing it with a flat piece of willow charcoal, which will not blacken the low places.



Planing and Sawing Machine.

The machine is intended for roughing off plates before sending them to the shaving machine, and is very simple, quick, and efficient in operation. A circular saw runs in an elevating iron table at one corner, for squaring up, and an outside cutter with sliding table is attached, when so ordered, for squaring up metal bodies, etc.

*Prices of Power Planing and Sawing Machines, with outside cutter
and sliding table for squaring up.*

NO. 3. 12-INCH STROKE.

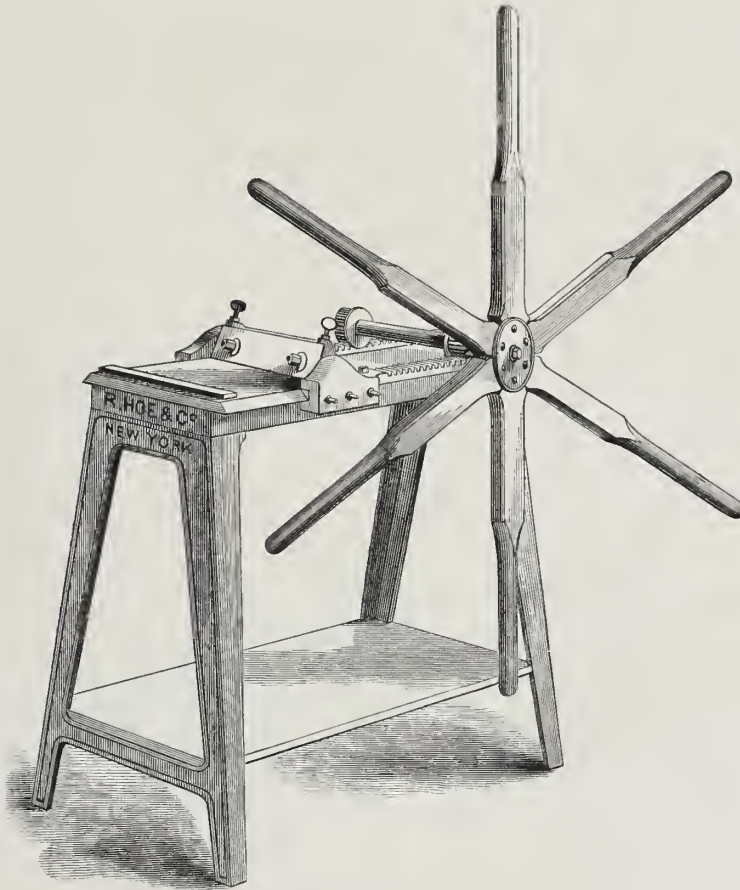
	Price.		Price.
To take on plate 12×20 inches,	\$600	With saw, but without cutter	\$550
Without saw table and saw . .	550	Without saw or cutter . . .	500

NO. 5. 18-INCH STROKE.

	Price.		Price.
To take on plate 18×30 inches,	\$750	With cutter, but without saw	\$675
With saw, but without cutter .	675	Without saw or cutter . . .	600

NO. 6. 24-INCH STROKE.

	Price.		Price.
To take on plate 24×40 inches,	\$1000	With cutter, but without saw,	\$900
With saw, but without cutter,	900	Without saw or cutter . . .	850



Single-Geared Hand Shaving Machine.

This hand machine, for thickening plates, is made all of iron. It consists of a table, planed true, on which the plates are placed, and a head, with adjustable knife, driven by rack and pinion behind it.

Prices of Hand Shaving Machines, for stereotype and electrotype plates.

No.	Taking plate	Price.
3 . .	12 inches wide	\$150.00
5 . .	18 inches wide 2 handles . .	200.00
6 . .	21 inches wide . . Double geared . . 2 handles . .	325.00
7 . .	24 inches wide . . Double geared . . 2 handles . .	425.00

HIGH PLACES

Are rubbed down with a slip stone and water, and rough places touched up with a piece of fine emery paper.

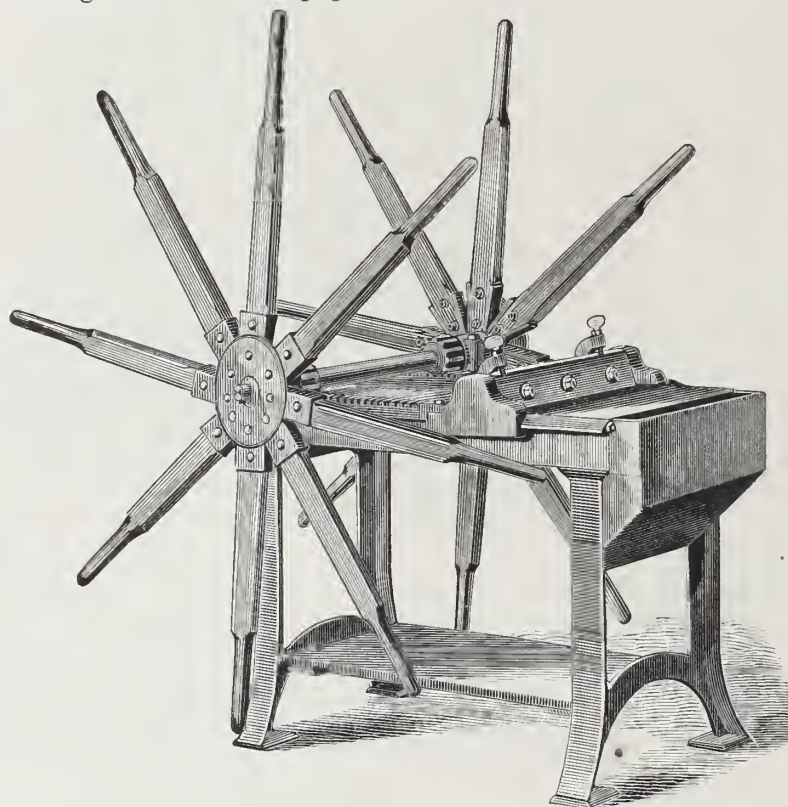
DEFECTIVE LETTERS

May in some cases be remedied by punching them up—as in the case of the dots of small *i*'s, which are very often wanting.



To replace a single letter, the old one is first punched out with a chisel-edged punch the exact size of the body of the letter. To prevent "burring," the backing metal below the letter to be removed is first ploughed out with a square-pointed graver. The exact place to cut this away is found by a pair of gauging calipers, one point of which marks the under side of the plate, while the other points to the letter.

Full instructions concerning shaving, bevelling, dressing, routing, and altering will be found on page 123 *et seq.*, following Part II., on Stereotyping.



Double-Geared Hand Shaving Machine.

See prices on page 105.

MISCELLANEOUS.

ELECTROTYPING FROM PLASTER MOULDS.

Plaster moulds* may be used for electrotypes by soaking them in wax, covering with a mixture of a solution of one gramme of nitrate of silver in two grammes of water, to which are added two and a half grammes of ammonia, and then three grammes of absolute alcohol. The mould is then exposed to sulphuretted hydrogen gas (made by pouring dilute sulphuric acid on powdered sulphide of iron).

* For the preparation of these, see under Stereotyping.

II.

STEREOTYPING.

In stereotyping, or the making of cast type-metal duplicates of relief printing forms, there are three processes employed, respectively known, from the material employed in making the reverse matrix, or mould, as the plaster, the clay, and the paper processes, each adapted to special cases. In the first two, the preparation of the forms is alike, and is identical with that described under Electrotyping (page 79). In the paper process, low spaces may be used.

THE PLASTER PROCESS.

Thin pieces of metal, bevelled at the top, are put at the sides of the pages, to form bevells to the plates when cast. The chases used in stereotyping are thinner than printers use, in order that the flask may sit low enough around the type. They are seldom larger than will hold three octavo or four small duodecimo pages.

It is very important that the composition should be well done, the lines evenly justified, and that the type be square on its feet, for carelessness in these particulars will be apt to cause the plaster to break away and spoil the mould. It is also essential that the type be washed perfectly clean, and that lye be thoroughly rinsed off before it has time to dry on the type, as it will act upon the plaster and destroy the face of the mould. All spaces and leads sticking up should be pushed down, and the form properly planed down before the mould is taken.

OILING.

After the form is prepared, the type is oiled with a soft hair brush, made specially for stereotypers' use, using not much oil, but working it thoroughly into every crevice, to prevent the plaster from adhering to the form. Sweet oil is generally preferred for this purpose, though other kinds are sometimes used. Too much oil impairs the sharpness of the cast.

THE FLASK.

After the type is oiled, a frame called a flask, which is also oiled, is put on the form and surrounds the type. It is intended to hold the half-fluid plaster over the type till it becomes hard, and it is commonly made of stereotype

metal, though it may be made of iron. It has a flange around the lower inside edge, and is bevelled from the flange to the top, affording sufficient support to raise the mould from the type, to which it adheres with considerable tenacity. Through each corner of the flask runs a thumb screw, by which it can be accurately adjusted on all sides, and after the mould is set, can be gradually lifted clear from the form. The flask should sit pretty close to the type, but as forms vary so much that it is impossible to have flasks fit all, pieces of tin or pasteboard are laid under the flask where it does not come close enough to the type to prevent the plaster from running out at the bottom. The flask itself need not sit close upon the chase or furniture; it is enough that the screws all touch, so as just to clear it from the chase.

PLASTER CASTS FROM GELATINE PLATES.

In making plaster casts from swelled gelatine films on glass plates, in photo-relief engraving, the operation is very much the same as when moulding from type. The irons are used with the thin side resting on the plate, their ends being propped up with a piece of glass the same thickness as the gelatine film and plate. A little water is allowed to rest on the surface of the gelatine, to prevent sticking. The preparation of the plaster, pouring, etc., are the same as when moulding from type. The mould may be removed, when set, by inserting the straight-edge between the plate and the mould, and using it as a lever.

Before casting, it is usual to harden the gelatine with some such agent as chrome alum. This prevents the gelatine film from ripping off the glass, or adhering to the cast.

THE PLASTER.

When the flask is properly adjusted, the moulder mixes his plaster, the quantity varying with the number and size of the forms. About a pint suffices for a form of three pages duodecimo. It is mixed in a copper can, or other vessel, which may be six inches in diameter and nine inches deep, the water being put in first, and then all the plaster that may be required, as it is better to have to add water than plaster. The plaster should be slowly added, squeezing it as it mixes, to prevent lumping. They are stirred together for a few seconds till thoroughly mixed, and of the consistence of thick molasses. A little salt is usually added, to make the casts set quicker. The rapidity of setting varies with different plasters. The salt also renders the mould less liable to crack with the heat in casting.

A small portion of the plaster, just about enough to cover the form, is poured over the face of the type. This should be done very carefully, putting the lip of the can near one corner of the flask. Pouring from a height produces bubbles, which ruin the cast.

ROLLING.

The plaster is by many worked into the type with a small wooden roller, having an iron rod running through it, and projecting at the ends for

handles, and covered with several thicknesses of flannel, and a tight buckskin over all.

The rolling in of the plaster is for the purpose of forcing it into the hollows of the type and expelling the air, thus preventing what are called "round picks" in the plates, which are occasioned by air-holes, which in casting are filled with metal, and form globules that have to be picked out.

When the plaster is rolled too much, what are termed "solid picks" result—that is, the plaster breaks off so that the bowls of the letters of the plate are filled with metal, which must be removed by the finisher. A large proportion of the picking, the most expensive part of finishing, may be saved by good moulding. Some use a brush and commence the process of working the plaster in while it is yet creamy.

Having worked the plaster in enough, more is poured on to fill the flask, and when it has become somewhat stiff (not before), the top of the mould is levelled off by running a straight-edge across it, bearing lightly upon the top of the flask.

As the plaster begins to set from the time it is first mixed, only requiring a few minutes to lose its fluidity, all the operations of moulding must be performed expeditiously.

In about five minutes the mould will become hard enough to take off. Never disturb it until the plaster has completely set. Taking off is done by gently turning the screws so as to raise the flask and mould evenly and gradually all around, as the quality of the mould depends a good deal on this. The two screws situated diagonally to each other are turned half-way around, then a half-turn is given to the other two screws, and so alternately, till the mould is felt to give way, when they may be turned faster.

After the mould is taken off the type, it is examined, by holding it up in front of the light, and looking directly into the letters. If too many picks, either round or solid, or any other serious defects, are discovered, the mould is condemned, and another taken, as it is less trouble and expense to make a new mould than to finish imperfect plates. The form is also looked over, and the plaster that may have broken off in or around the type is carefully picked out. A needle fitted with a handle is used for this purpose.

CASTING.

The pans used for casting are of iron, and a good size is twenty inches in length by fifteen in width, and one and three-quarters in depth. They are made with sloping sides, wider at the top than at the bottom, and have covers fitted to them, with the corners cut off, so as to leave openings into the pan, and with holes near the centre. Each pan has also a float, or iron plate, of the size of the bottom, and a movable and curved iron handle, which catches on flanges on the sides of the pan, and is furnished with a screw to hold the cover in its place, and has holes near the centre, by which it may be attached to the crane.

The pan having been heated, the float is laid on the bottom of the casting pan, and the moulds are placed upon it, with face downward. The cover is

then chalked on the under side and adjusted to the pan, leaving a space of about one-eighth of an inch between the back of the moulds and the cover. The movable handle is attached to the pan, and the screw brought down to the cover, after which the handle is fitted to the crane and the pan swung over into the pot of melted metal on the furnace, where it floats upon the surface. In order to avoid cracking, it is left in this position a little while, that the pan and contents may become evenly heated, and is then pressed down by means of the crane till the metal can just flow into the corners. (The metal should be carefully skimmed just before putting the pan in.) It soon covers the floater, and finds its way between it and the moulds, filling up the interval, and, pressing upward against the face of the moulds, fills all the crevices and irregularities. As soon as the pan is filled, it is submerged, and remains so till the bubbling and boiling, caused by the expulsion of air and moisture contained in the mould, cease.

Great care must be taken to have the metal of a proper temperature. If not hot enough, it will not flow freely, and there will be no face to the plates; and if too hot, the moulds will crack, and the metal will make a ridge upon the face of the plate and spoil it. The test commonly applied by casters is to dip stiff writing-paper into the metal, when, if the temperature is right, the paper will turn a light brown; but if too high, the paper will be quickly scorched to a dark brown, or snap off with the heat, and measures must be taken to cool the metal down, either by diminishing the draught of the fire, and waiting till this has its effect, or by putting cold metal into the pot.

The pan and its contents are then lifted out and swung on to the bed of the cooling trough, which is of about twice the size of the pan, and has in the centre a raised platform. The bed must be perfectly level, and the water should just cover it when the pan is first put in, more being added as the pan cools, till it comes nearly to the top of the pan.

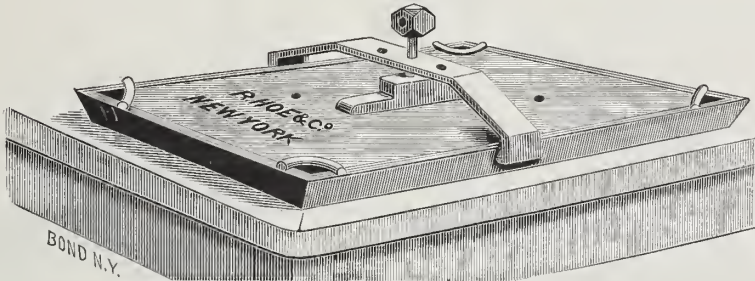
If the casts are rapidly cooled, owing to too much water in the trough, they will crack.

The metal shrinks in cooling, and, as fast as it settles down, the caster supplies the deficiency by pouring a little hot metal from a ladle into the openings through the cover.

When the cast is cooled off, it is taken from the water-trough and placed on a large block of wood, called the knocking-out block, which is about twenty-eight inches high, and a little larger than the pan. The iron handle is then unscrewed and the cover taken off, by prying it up with a cold chisel at the corners. The pan is then turned over and allowed to fall top downward with a little shock. The cast falls out. It looks like a solid pig of metal, the floater, plates, and moulds being enveloped with a covering of metal. The cast is again turned over, so that it lies upon the block in the same position that it did in the pan. A few smart blows with a hammer upon the corners and sides remove the heavier parts of the cast, leaving the moulds and plates exposed upon the floater. The thin covering of metal is stripped off the backs of the moulds, and the solid metal which fills the spaces between the moulds is knocked away. The plaster has become brittle by the heat, so that it crumbles, and is easily removed from the plate, except that which was in

contact with the metal, which will adhere to it. The plates are, therefore, put into a trough of water and allowed to soak, so that the plaster may be easily washed out by beating with a stiff brush. The moulds are, of course, completely destroyed in casting, and cannot be used a second time.

In melting off the adhering metal from the old plaster moulds, be sure that the plaster is not wet, as the steam generated would cause melted metal to fly out of the pot, and the operator would be apt to be badly burned.



Casting Pan.

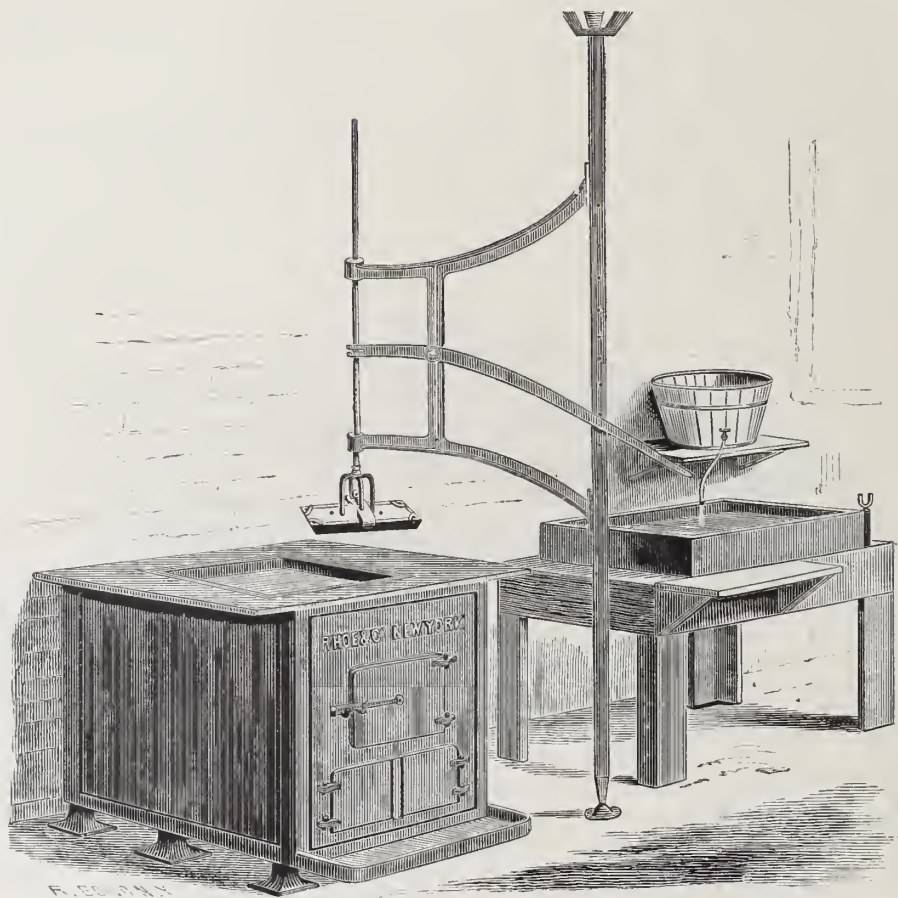
Prices of Iron Casting Pans.

No.	Size of matter.	Price.	No.	Size of matter.	Price.
1 . .	6 × 9 inches . .	\$14.50	4 . .	15 × 20 inches . .	\$30.00
2 . .	9 × 12 inches . .	18.00	5 . .	18 × 24 inches . .	36.00
3 . .	12 × 16 inches . .	24.00	6 . .	21 × 28 inches . .	42.00

Includes cover floater, bridle, and screw.

COLOR PLATES.

In stereotyping blocks used for color printing, where absolute register is imperative, care must be taken (especially with large ones) to make all of a series with the same batch of plaster and the same run of metal, and as nearly as possible under the same conditions, else unequal shrinkage (of the plaster especially) will give blocks differing in register, and hence utterly useless for color printing. It is best to mould and cast all the plates the same size, although there may be no need, for printing purposes, of having some blocks—say those for red or for gold—as large as the “key.” From a plate which is a trifle too large, one somewhat smaller may be obtained by taking a cast, then one from the second, etc., each one being slightly smaller than the one from which it is taken. The thinner the plaster, the greater the shrinkage.



Melting Furnace, Crane, Casting Pan, and Cooling Trough used in Plaster Process.

Prices of Iron Melting Furnaces, for Plaster Process.

No.	Size of matter.	Depth of pot.	Capacity.	Price.	Boxing.
2	9 × 12 in.	10 in.	600 lbs. metal	\$75.00	\$2.50
3	12 × 16 in.	10 in.	1000 lbs. metal	135.00	4.00
4	15 × 20 in.	10 in.	1500 lbs. metal	195.00	6.00

Price of Iron Crane for iron furnaces \$60.00

Price of Iron Cooling Troughs for casting pans

These troughs are furnished with waste cask and cooling stand for the pans.

THE CLAY PROCESS.

THE MOULDING COMPOSITION.

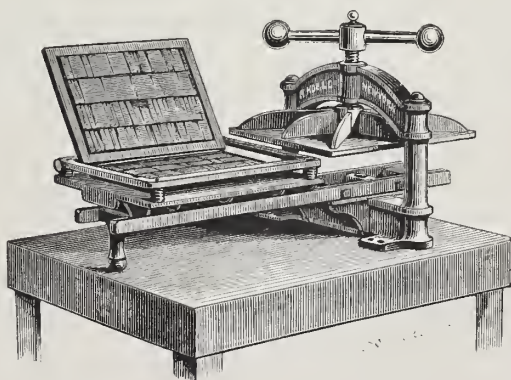
Take potters' washed clay, dried and powdered, eight pounds; kaolin, four pounds; powdered soapstone, three pounds; pass them through a fine sieve; then add water, and mix thoroughly until the mixture is of the consistency of dough, and the composition is ready for use.

Place the form on the bed of the moulding press; see that it is properly locked-up, spaces down, etc., as is usual with plaster stereotyping; then take a fine goat's-hair brush, dip it lightly into a little benzine, and brush the face of the type well with it.

Take a sufficient quantity of the composition to mould the form; spread it out on the slab and sprinkle about two tablespoonfuls of fine plaster of Paris to every quarter of a pound of composition; pour a little water on, and mix it well with a trowel. This should be done quickly, as the plaster is designed to harden the composition slightly during the process of moulding, for which it is now ready.

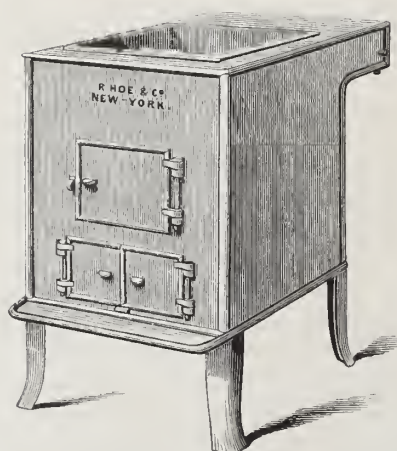
MOULDING.

The moulder will observe that there are two flat iron plates, one being an inch narrower than the other. Take the smaller of the two, and, with a brush, cover the surface with thick gum-arabic water; then, with the trowel, spread the moulding composition smoothly over it and level it off by the instrument, which is made to fit exactly the sides of this plate, and is drawn over the composition to make a perfectly even surface.



Press for Stereotype Moulding.

Price of moulding press, 9 × 12 inches \$125.00



Stereotype Melting Furnace—Clay Process.

Metal furnace, complete, all iron, for 300 lbs. metal \$75.00

Clay Process.

The iron plate, with the moulding material thus prepared, is set into the spring frame on the bed of the press, and kept steady by the thumb screw.

The form having been previously brushed over with the benzine, now cover it with a sheet of thin white paper, and over that with a piece of thin white muslin; then turn the plate over and take a light impression; run the bed back, lift the plate, and observe how far the impression has gone; take the muslin and paper off, brush the form lightly with the benzine again, put on another piece of paper and cloth, laying the previous ones aside for future use; then run under again and take another light impression, being careful not to go too far; lift the moulding plate again, and take off both cloth and paper. This operation is only to give depth to the spaces and blanks.

Now brush again with the benzine, and take an impression into the clay, without any cloth or paper. This must be done lightly and with care, as, if the impression is too deep, the clay will tear out. It generally requires two or three impressions, after the cloth and paper are removed, to get a good mould, each impression being a little deeper than the preceding one; by the time the last impression is made, the composition has become somewhat harder from the setting of the plaster of Paris.

After getting a good mould, clean the edges of the iron plate from the surplus composition, so that the bent wire may go around three sides. The iron plate, with the mould, should now be placed on the flat part of the metal furnace, and dried until no steam can be seen, when it must be taken off and placed on the top of the other flat iron plate, which is one inch larger, and the

two placed on the melted metal; where they will float, with the face of the mould up. Here they must remain until the two plates and the mould are of the same temperature as the melted metal, which can be easily found by pouring a few drops of the metal on the cleared edge of the iron plate; at first it will set, then, when it is melted, the plates, with the mould, can be taken out.

Place the two plates on the upper edge of the metal pot, and slide one off the other; put the bent wire around the three sides of the mould; then with a pair of tongs put the larger plate on, so that three of the sides shall be even, and the inch of extra width shall project over on the fourth side. Now clamp the three sides, and place the whole in the trough in an inclined position, the larger plate being at the back; pour in the melted metal, and, when full, sprinkle water on with the watering-pot, commencing at the bottom, and gradually cooling up; as the metal cools and shrinks, fill up with fresh metal.

When the metal sets, take out the cast and wash out the clay with a brush and water.

THE PAPIER-MACHE* PROCESS.

This process is especially adapted to newspaper work, where curved plates are desired and time is an object. Its peculiar beauty is that several casts can be taken from one mould or matrix. It is also extensively used in job work, particularly when many plates of the same kind are required.

TO PREPARE THE PASTE.

Take five ounces of flour, seven ounces of white starch, a large teaspoonful of powdered alum, and four quarts of water. Put the flour, starch, and alum into a saucepan, and mix with a little of the water, cold, until the whole becomes of the consistency of thick cream. Then gradually add the remainder of the water, which must be boiling, stirring well meantime to prevent lumps. Put the mixture over the fire and stir until it boils; then let it stand until quite cold, when it should look like jelly. When you are ready for work, add Spanish whiting, the mixture not to be too stiff to spread readily with the paste-brush. Put through a fine wire sieve with a stiff brush, and it is ready for use.

THE FORM.

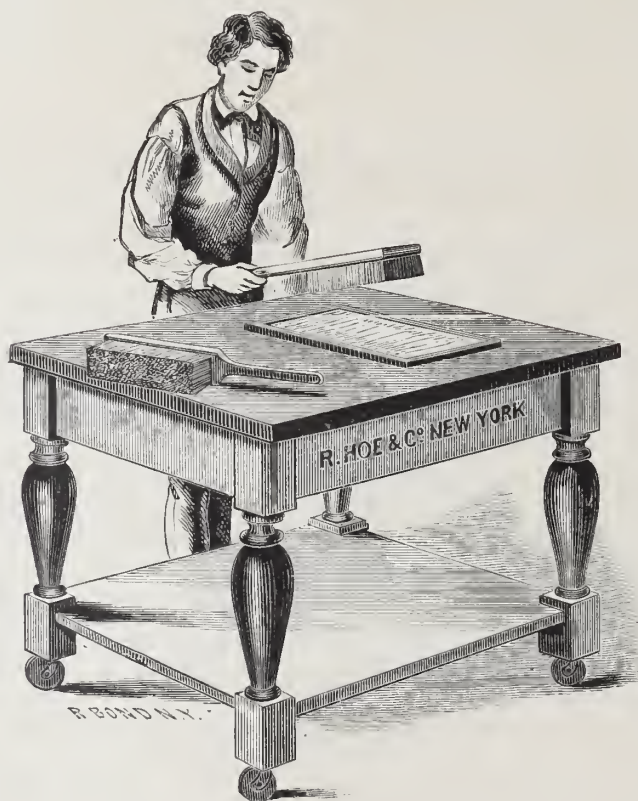
Impose the form with the type-high wood or metal border furniture around it like an ordinary rule border, putting the bevelled edge close against the type, and slightly loosening the quoins. It is possible to cast metal border furniture in the mould, using the gauge, and bevelling the edge that goes against the type with plane and shoot-board; but a more convenient way is to cast it in a border furniture mould, made for the purpose. For regular newspaper work, the chases are made type-high, and no border furniture is required.

* Pronounced "pap-yay mah-shay"; and NOT "paper mashay."



TO PREPARE THE MATRIX PAPER.

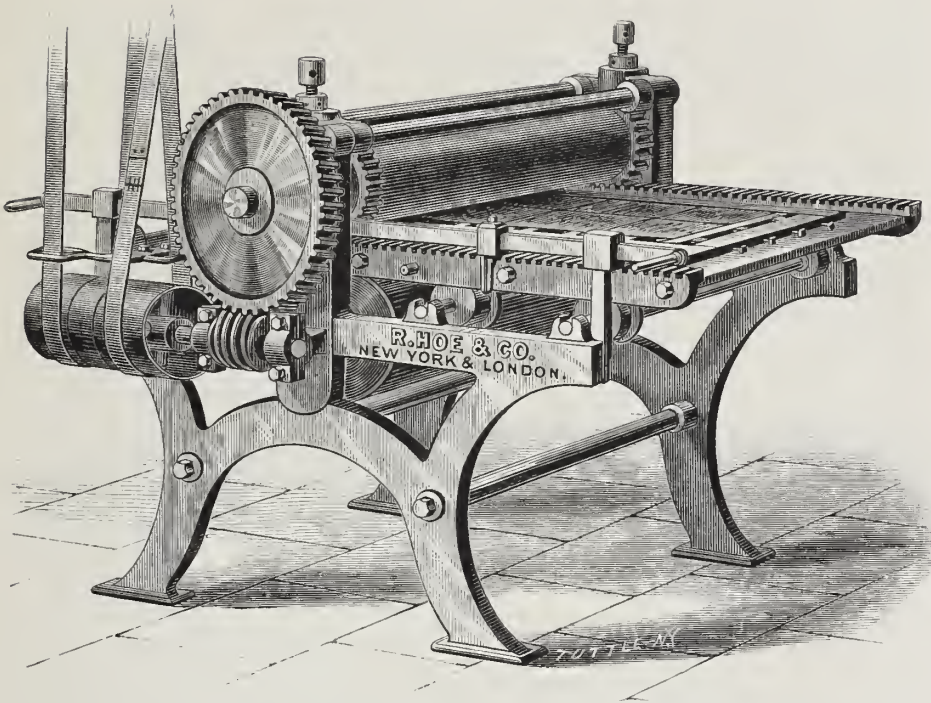
See that the paper used is like the specimens furnished with the apparatus. Take a sheet, unsized and soft, not so thick as ordinary blotting paper, and spread the paste evenly upon it. Lay a piece of tissue paper lightly over this, and roll it with an iron roller till all wrinkles disappear. Add a second sheet of tissue, then a third, and the matrix is made. When enough are made for one or two days, dip them severally in water, saturating them thoroughly, and place the whole between two heavy plates about three-sixteenths of an inch thick, that may be cast in the mould, and place the whole under water in a trough. They will be ready for use the next day.



Iron-Top Beating Table, for Paper Process.

Prices of Iron-Top Beating Table, for Paper Process.

No.	Size matter.	Price, fixed top.	Price, ele- vating top.	No.	Size matter.	Price, fixed top	Price, ele- vating top.
4	15 × 20 in.	\$40.00	\$75.00	6	21 × 28 in.	\$55.00	\$105.00
5	18 × 24 in.	50.00	95.00	7	24 × 32 in.	65.00	125.00



Matrix Rolling Machine for Newspaper Work — Papier-Maché Process.

This machine, which is constructed entirely of iron, in a very substantial manner, takes the place, in large establishments, of the beating table and brush, and on it a paper matrix can be prepared for the drying press in from two to four minutes, thus making a very considerable saving in time. The form is laid upon the traversing bed, and passes slowly backward and forward under the large roller.

Price of matrix rolling machine, 32 × 37 inches \$450.00

TO MOULD THE MATRIX.

Cut a piece of this prepared paper with scissors, rather larger than the page to be stereotyped; prepare the face—*i. e.*, the tissue side—with impalpably fine powdered French chalk, absolutely free from grit; gently, but evenly, smoothing it over with the preparing brush. Oil the type sparingly with a soft brush dipped in the best olive oil, and lay the paper face downward on the form. Dip a piece of coarse linen in cold water, and wring it out; lay it over the back of the matrix, and beat the latter gently into the type, taking care to bring the beating brush down flat every stroke. When well beaten in, paste a piece of soft matrix paper on the back of the matrix, and beat again without the cloth, gently lifting up one corner to see if it is sufficiently deep. If an open or rule-work form, gently pick the cartridge paper through in the open

parts, to liberate the air. Extra depth may be had by packing between the matrix and cartridge paper small pieces of an old matrix, carefully pasting them to the matrix, observing that the piece do not exceed half the size of the blank spaces.

DRYING.

The matrix is dried on the form of type by means of a special press. The steam having been turned on, put a double thickness of blanket on the matrix, and screw down pretty hard. After ten or fifteen minutes, unscrew the press, remove the blanket, and let the matrix dry about ten minutes; then gently separate the matrix. It sometimes happens that the matrix will not leave the type, in which case the form must be made once more hot, and form, matrix, and all plunged into cold water; the matrix will then come off, but of course is destroyed. This seldom, if ever, occurs after a little practice.

If wood-cuts, or forms with wood-cuts, are to be done, the same process is applicable, except that the matrix must be dried cold, consequently taking much more time.

TO PREPARE THE MATRIX FOR CASTING.

Cut around it with scissors, leaving about three pica ems of margin. Beat down with a hammer any inaccuracy caused by the imperfect joining of the border furniture, paste a piece of brown paper to the front margin of the matrix, and lay it on the drying press to get thoroughly warmed through.

The following note, by the compiler, in the *Polytechnic Review* for May, 1876, may be interesting as showing some variations in the before-described practice, and as giving the usual running time for each operation:

"TYPE, PRESSES, AND THE WEE SMA' HOURS.

"A recent visit to the stereotyping department of the New-York *Herald* was well repaid. Mr. E. L. Henderson, the superintendent, very kindly explained the whole process of making paper matrices, and stereotype casts from these. The writer timed the operations, with the following result:

"At 12.24 the form of the fifth page of the *Herald*, bearing the date of March 21st, came up the elevator from the composition-room. It was slid on a long iron table, oiled with a roller, and a sheet of thick tissue-faced paper (dampened) and then a blanket placed thereon. The whole was run under a heavy roller and back again, forcing the paper into the finest recesses of the type, by 12.26; by 12.27 the depressions were filled with plaster; by 12.28 the paper and plaster were coated with thick size, and another thick sheet of paper applied as a backing. A blanket was then laid on all, and the whole 'hot pressed' in a steam press until 12.34; by 12.35 the matrix was removed, trimmed square, and 'dusted'; by 12.36 it was snugly curved in a semi-cylindrical iron casting box, and a semi-cylindrical iron core, with peripheral corrugations, clamped so as to leave a semi-annular space of about three-eighths of an inch; by 12.36¼ the melted metal was dashed in from an adjacent kettle; by 12.37 the mould partly cooled by a dash of water, and the curved cast removed; by 12.37½ the cast was placed on a semi-cylindrical horse, and the end trimmed and bevelled by a vibrating circular saw; by 12.38½ the relief was improved by rapid chiselling in open spaces; and by 12.39 the inside was dressed neatly to gauge by a rotating planer bit. The dumb-waiter

then received the completed and yet hot cast, and sent it down six or seven stories into the basement press-room.

"Time of operation, fifteen minutes, of which eleven were occupied in making the paper mould. From this same mould ten casts are taken for the turtles of the single and double Bullock presses. These last receive the paper in a continuous web, print it on both sides, divide the twin sheets, and cut them off, and flit them off in four piles, at the rate of 15,000 sheets per hour for each double press.

"The pressman, Mr. Hale, keen-eyed and alert, motions or shouts to his assistants to stop or adjust the presses or paper, on the discovery of a fault or break. The hum of the whirring wheels, the soft cracking or kissing of the rollers, and the rustling of the flying paper, the shouting and rushing to and fro, the glittering lights and dancing shadows, are exciting in the highest degree."

THE METAL.

The metal used in stereotyping should, when cast in a plate, possess a bright, smooth surface, hardness, toughness, closeness of grain, and freedom from bubbles. To test the quality of the metal, run a little ingot out on a stone slab. The hardness may be tried with a graver, and the surface easily examined. By cracking the ingot with a hammer, the grain or crystalline quality is observed. A bright-surfaced and close-grained metal makes the best stereotypes. When the metal is too crystalline (generally due to excess of antimony), a little lead should be added. When too soft, add a little antimony. By pouring ingots and examining the fracture, the desired quality is arrived at.

Old type or stereotype plates melted down will answer every purpose, if good. Be careful not to put damp pieces in the molten metal, or it will fly.

OLD AND DIRTY METAL.—FLUXING.

It often happens that after constant use the metal becomes so dirty as to render good plates an impossibility, and cleaning then becomes a necessity. This is done by heating the metal until it burns the roll of test paper, and putting in powdered rosin, stirring the while with an iron rod. As the scum or dross appears on the surface, it should be skimmed off, and more rosin added, and the stirring continued until no more impurities can be extracted.

Wax and paraffine are also used in the place of rosin, but are not quite so effectual.

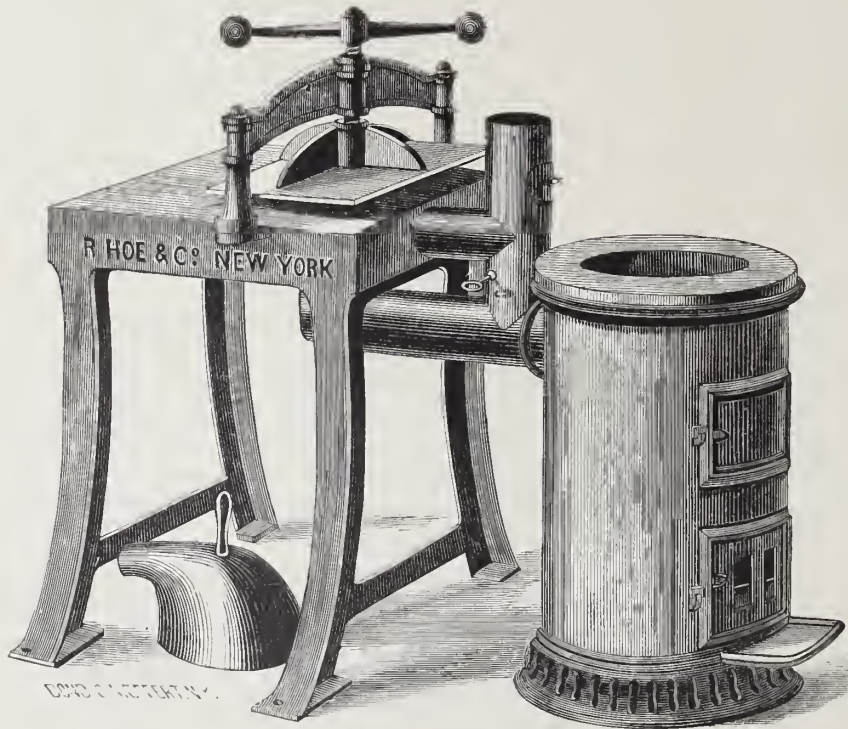
Metal that is not very dirty may be renewed by heating the metal quite hot, but not red hot, throwing on it about a tablespoonful of oil, and stirring it well, adding a little more oil, and stirring again, then throwing a handful of ashes over the metal and skimming it, when it should look like quicksilver. The dirty oil from a press, an old oily rag, or, in fact, almost any greasy substance, will answer the purpose. If the metal clings to the melting pot, making it look as though tinned, it is of poor quality, and if not set right by the flux, is nearly worthless, and the plates cast from it will be honey-combed. As fluxing causes a bad smell, it is well to have a portable sheet-iron bonnet made to the melting pot, with a small door through which to stir the metal, and a pipe leading to a flue to carry off the odor. This bonnet must be lifted off when casting. To ascertain the right heat of the metal for casting, fold some paper into slips, dip

into the pot, and if turned black, the metal is too hot, but if turned to a straw-color, it is just right.

TO CAST THE PLATE.

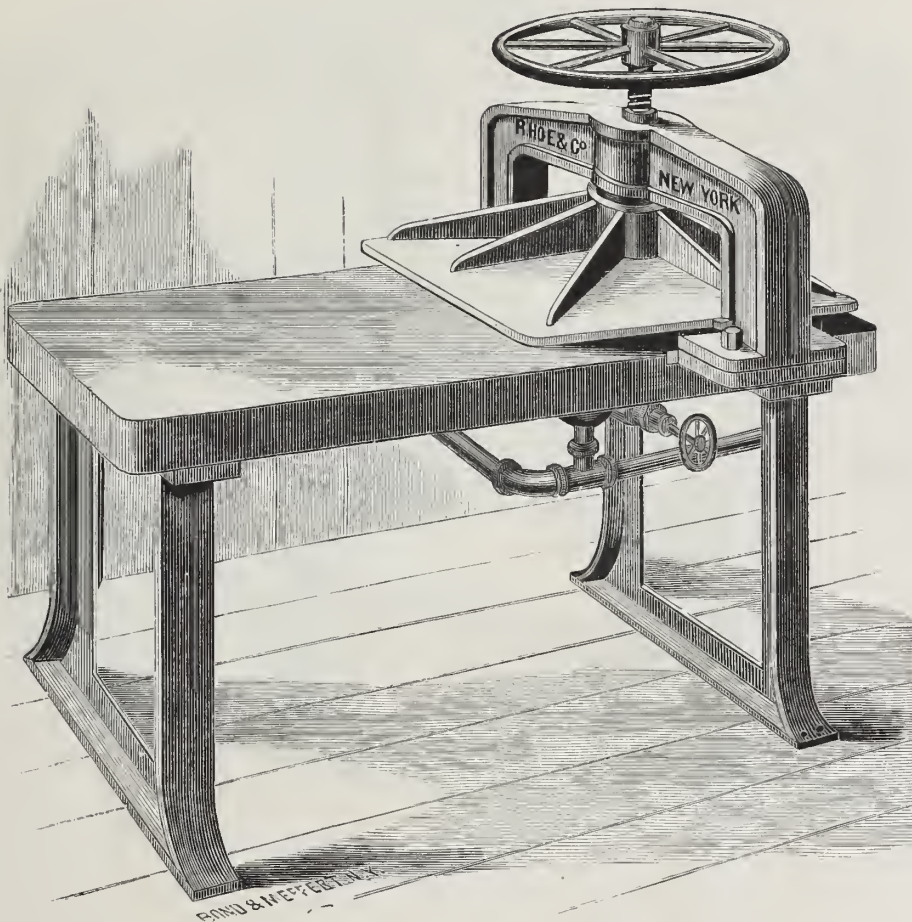
Place the gauge in the casting mould, properly adjusted, and pour it full of metal about three times, to heat the mould; then place the matrix in the mould, so that the paper hangs out of the mouth; place the gauge around three sides of the matrix, close to the work, and upon the margin, close to the mould, and screw tight. Hold the overhanging piece of paper in the left-hand, and, after skimming off the dross, pour a quick, continuous stream of molten metal. The paper is simply to conduct the metal and to prevent its getting behind the matrix.

In handling hot metal plates, furniture, etc., it is of course requisite to have holders, made of some stout woollen fabric.



Small Melting Furnace and Drying Press, combined.

Price, \$

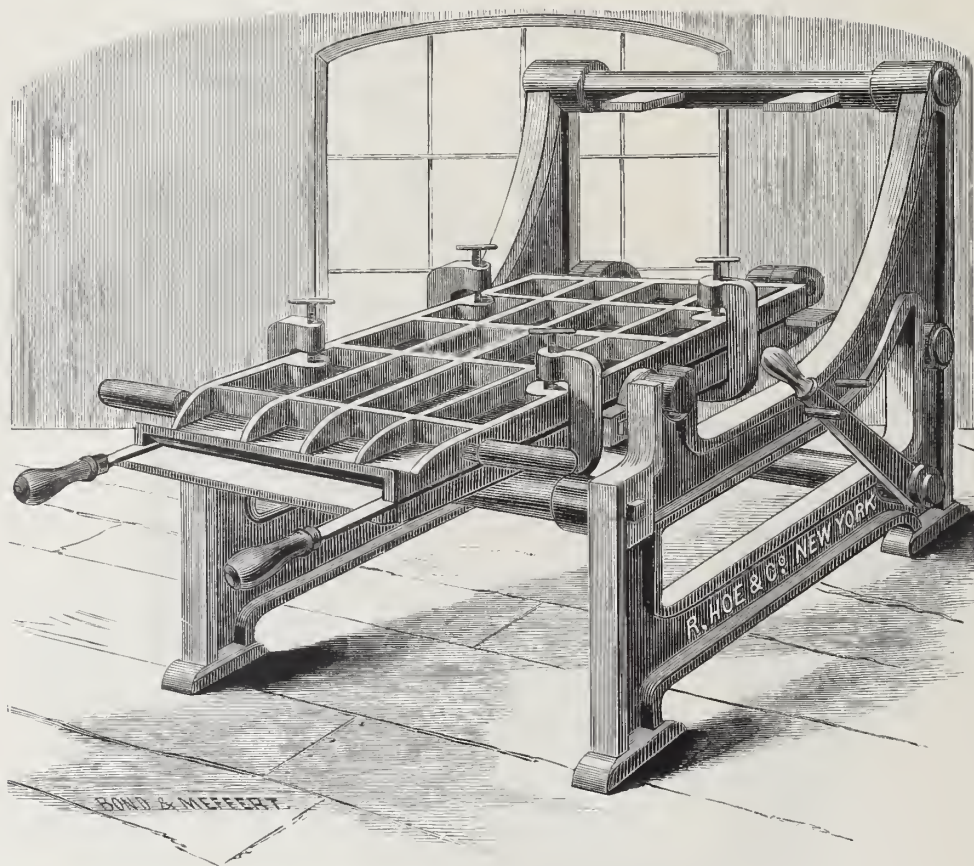


Stereotype Mould Drying Press, for Paper Process.

The table is heated by steam, which, at ordinary pressure, will dry a matrix in from six to eight minutes. Where haste is important, steam platens are furnished, by which the time of drying is reduced nearly one-half. It is desirable that the platen be perforated, to allow the escape of the moisture.

Prices of Steam Drying Presses.

No.	Size matter.	Price with solid platen.	Price with steam platen.	No.	Size matter.	Price with solid platen.	Price with steam platen.
2	9 × 12 in.	\$120.00	\$140.00	5	18 × 24 in.	\$300.00	\$360.00
3	12 × 16 in.	180.00	216.00	6	21 × 28 in.	360.00	440.00
4	15 × 20 in.	240.00	288.00	7	24 × 32 in.	450.00	550.00

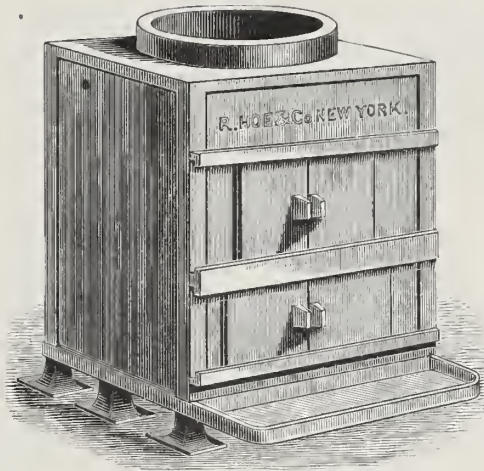


Flat Stereotype Plate Mould, for Paper Process.

This mould, for casting stereotype plates from a paper matrix, is made of iron and balanced in bearings in an iron frame. When used, it is held in a horizontal position by a trip lever, and the cover is thrown up against the back stay. The matrix is then laid in, the gauge bars adjusted to it, and the cover closed. In the smaller sizes, the cover is secured by a single screw in the centre; but in the larger sizes it is fastened by four or six clamps at the sides. The mould is then turned in an upright position to receive the metal, and back to a horizontal one to have the stereotype plate removed.

Prices of Iron Casting Moulds.

No.	Size matter.	Price of flat form.	Price of curved form.	Box-ing.	No.	Size matter.	Price of flat form.	Price of curved form.	Box-ing.
2	9 × 12 in.	\$120.00	\$180.00	\$2.00	5	18 × 24 in.	\$240.00	\$330.00	\$2.75
3	12 × 16 in.	145.00	210.00	2.25	6	21 × 28 in.	300.00	400.00	3.00
4	15 × 20 in.	185.00	270.00	2.50	7	24 × 32 in.	360.00	480.00	3.25



Stereotype Melting Furnace. Papier-Maché Process.

This furnace is strongly made of iron and lined with fire-brick. It stands clear of the floor on feet; and, as the bottom is lined, and a hearth projects in front of the doors, it is entirely free from the danger of setting fire.

Prices of Iron Melting Furnaces with Circular Pot.

No.	Diameter of pot.	Capacity.	Lined with fire-brick.	Boxing.
1	11 inches . . .	150 lbs. metal . .	\$75.00 . .	\$2.00
2	15 inches . . .	330 lbs. metal . .	100.00 . .	2.50
3	19 inches . . .	750 lbs. metal . .	150.00 . .	3.50
4	23 inches . . .	1,450 lbs. metal . .	195.00 . .	5.00
5	27 inches . . .	1,725 lbs. metal . .	240.00 . .	6.00
6	32 inches . . .	3,025 lbs. metal . .	300.00 . .	8.00

TO SEPARATE THE MATRIX FROM THE PLATE.

Should they refuse to part, beat the matrix with the beating brush; if still obstinate, make the plate hot on the moulding press and plunge into cold water, then put them with the matrix downmost in the hot moulding press, and press tightly with the hand, when the steam will force the matrix from the plate. The plate will be good, but the matrix spoiled, which is evidence that these instructions have not been correctly followed. Should the matrix separate from the plates without difficulty, many plates may be cast from the same matrix. (See directions for finishing.)

SHAVING.

All the plates of the same book should be shaved to the same gauge, and there is no part of the finishing the printer criticizes so closely as accuracy in this

respect, for his labor may be greatly increased by neglect of the stereotyper or electrotyper to make them even.

The plates are then chiselled—that is, the bearers are cut away and all the blank spaces are chipped down with chisel and mallet low enough to avoid danger of blacking in printing. The foot-lines are cut down low and partially trimmed off. The heads are trimmed close to the head-line, and should be perfectly accurate.

The sides of the plate are bevelled with a plane, made specially for this purpose, which gives a smooth edge with a true and uniform slope the whole length. This is necessary to enable the printer to make register, for it ensures that the catches of the blocks will hold all the plates in the same relative position. In large establishments this is done with the power bevelling machine.

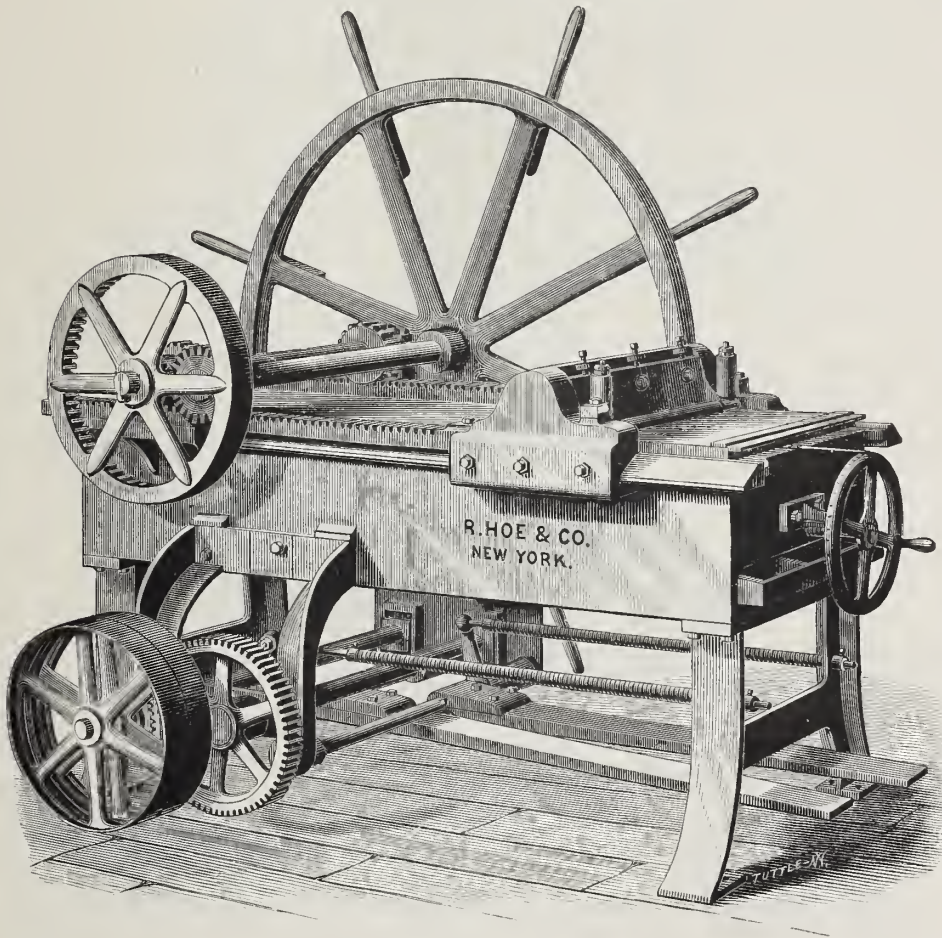
After bevelling, and squaring, and routing, the plates are examined and closely scrutinized, letter by letter, though practice enables the finisher to do this very rapidly, and his eye catches quickly and surely all the defects. Some letters may be filled up with metal, which must be picked away to restore the shape of the type, or the mould may have broken away, leaving several letters run together. Any unnecessary matter that would show in printing, and which was left in chiselling, must be cut away, and letters injured in any of the previous processes must be repaired or replaced. In short, the finisher's aim is to make the plate as good as the form from which it is made.

ALTERATIONS.

An important part of the finisher's business is making alterations in plates. Sometimes before the work is sent to the printer, but after the type is distributed, it is found necessary to make corrections or improvements in plates, and often changes are called for in later editions. These may be of single letters or words, or parts of a line, or whole paragraphs. If the change is of a single letter or word, occupying the same space as that already in the plate, the latter is cut out and a hole is made through the plate just large enough to admit the new letter or word, the type of which is taken and put into the hole. A good workman will make it so accurate that a little pressure must be exerted to insert the type. The plate is then laid face downward upon a smooth, level surface, the bottom of the type projecting out of the back of the plate; the correction is driven lightly to the surface on which the plate rests; the ends of the type are cut off close with a pair of nippers, and the parts remaining in the plate are soldered. The inequalities of the solder are then filed or shaved down to the gauge of the plate.

If the correction should occupy more or less space than the matter it supersedes, more words are taken in, till the difference can be made up by reducing or increasing the spaces between the words. A good finisher will prefer, however, to put in a whole line, or even have a piece set up, than have the spacing so uneven as to make the correction conspicuous. If the alteration involves more than a line, it is generally set up and cast; the plate is sawed through, the incorrect matter is cut off, and the new piece adjusted properly and soldered on the back.

After all the work on the plates is done, the foreman, or some experienced workman, sees that they are arranged in order by folios, and that they are made up into sheets, with pasteboards between the plates, examining each plate as he handles it, to make sure nothing has been overlooked. The plates are then packed in boxes of proper construction, and are ready to go to press.



Power Shaving Machine.

Price of Stereotype Plate Power Shaving Machine.

No.

6 To shave plate having matter 22 × 28 inches \$850.00

MOUNTING.—BLOCKING.

For all job work and much book work, the backed shells are not used on the press direct, but must be made type-high. This is generally done by a wooden block.

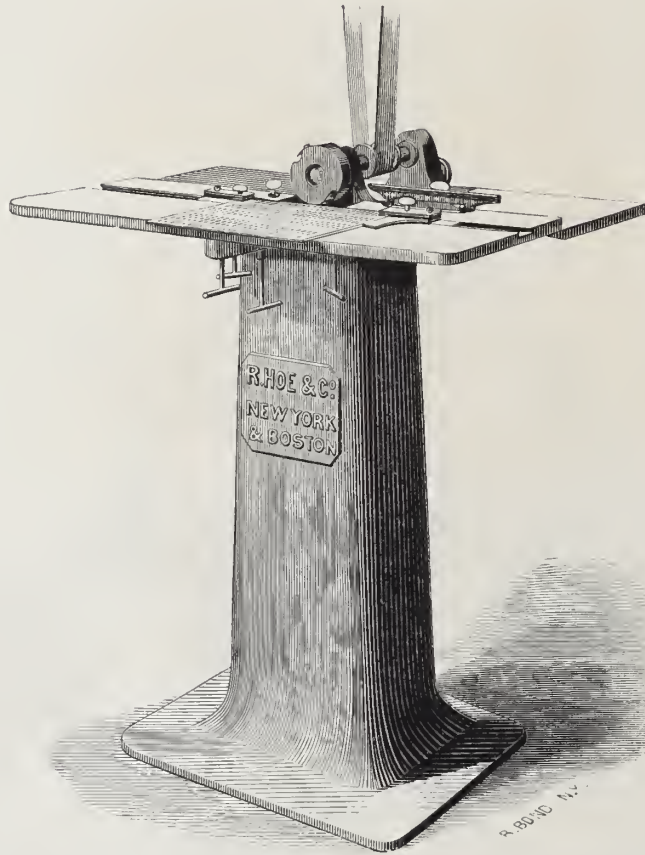


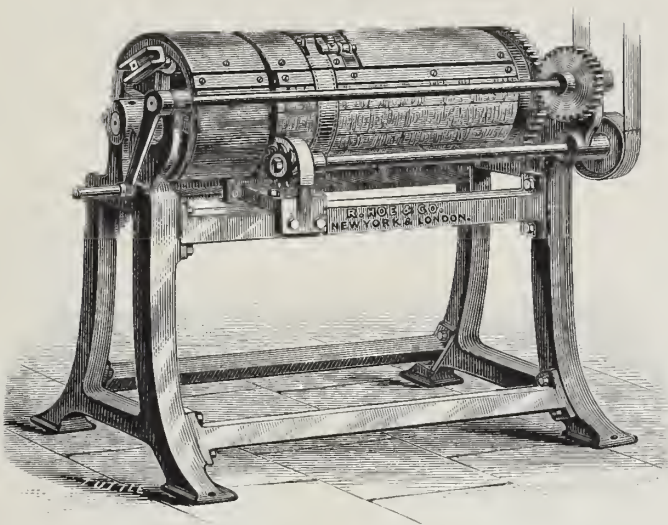
Plate Bevelling Machine.

This little machine dresses off and bevels the edges of stereotype and electrotypes plates in the most perfect and rapid manner, equally on all sides, and parallel to the matter. The edge of the printing matter is placed against an adjustable side gauge, secured in this position by clamps, and passed quickly before the revolving cutter, a stationary cutter at the same time taking off the sharp corner from the under edge of the plate. The table can be adjusted in height and also inclined to give a bevel more or less acute, and the revolving cutter-head is adjustable horizontally to suit the position of the table. A brass cover over the cutter prevents the chips from flying, and drops them into a box below. A larger-sized machine is used for newspaper work.

A counter-shaft, hangers, tight and loose pulleys, driving pulleys, and a set of cutters, with gauges for grinding and setting them, accompany each machine.

Power Bevelling Machines.

No.		Price.
1	For book work, $11\frac{1}{2} \times 36$ inch table	\$180.00
2	For news work, 16×51 inch table	200.00



Dressing Table for Curved Newspaper Plates.
(Used on perfecting presses.)

*Prices of Iron Finishing or Chiselling Cylinders for stereotype plates.
Small curve, for web presses.*

No.	For plates	Price.	No.	For plates	Price.
2	9 × 12 inches	\$120.00	5	18 × 24 inches	\$135.00
3	12 × 16 inches	125.00	6	21 × 28 inches	140.00
4	15 × 20 inches	130.00	7	24 × 32 inches	155.00

THE WOOD.

For this purpose, cherry is the most generally used wood, though mahogany and oak are employed by some. Whatever wood be used, it should be very well seasoned, and free from knots or checks.

The plate being sawed by circular or hand saw, as small as is possible, a block is chosen, exactly that size, if possible, although if too large it may be readily dressed off. The plate is fastened to it by round wire nails about half an inch long. If the nails be good, and the operator skilful, they can be driven without risk, perforating the metal, and hold much tighter than where the awl is used. The nails should be plentifully used, especially on large blocks, where there is great danger lest the strain in the press, or twisting of the blocks from heat or dampness, draw them. In fact, it is best to use some countersunk wood screws on at least the largest blocks.

Care should be taken lest the nail-heads project, or the neighboring metal be forced up above the printing surface, this being more likely with stereotype than with electrotpe blocks. It is well to use a small nail-punch, to ensure that the nails are well driven home.

The wooden block and finished plate should together be exactly type-height—that is, the height of type in the city where the blocking is done, for many type-founders purposely maintain special type-heights of their own, to prevent their rivals' type being used in the same form with theirs.

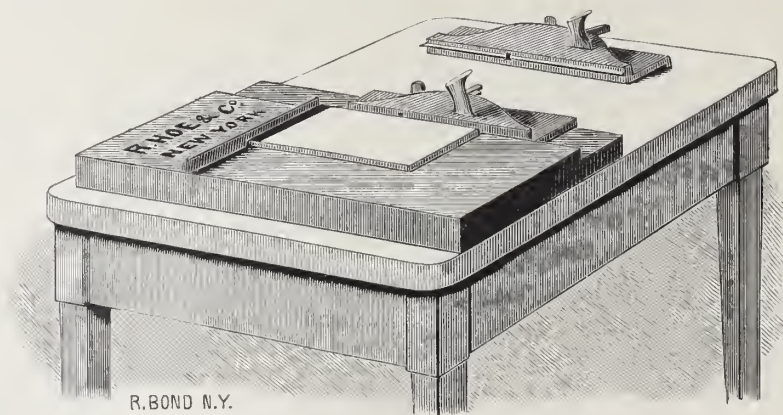
Many European blocks which come over here (especially the German and Swedish) are at least "a card-board" lower than our standard.

It might be well in some cases to make the blocks a trifle under type-height, which would ensure their being underlaid, and printing better than without any such care.

But all blocks of a series should be invariable in their thickness, and unless some special reason exist, all those from any one blocker should gauge the same.

After blocking, they are squared up with a plane, and the surfaces must be not only smooth, square, and true one with another, but the sides must be exactly "plumb," or at right angles with the printing face and bottom. Rough or untrue blocks entail annoyance, delay, and loss to the printer, and are an abomination and utterly inexcusable.

For thus squaring the sides and ends of blocked and unblocked electrotypes or stereotypes, the "shoot-board" is used. It consists of an accurately trued iron bed, with a crosspiece exactly at right angles to it. One plane is narrow and bevelled for unblocked, the other for wide and square blocked, plates.



R. BOND N.Y.

Shoot-Board and Two Planes.

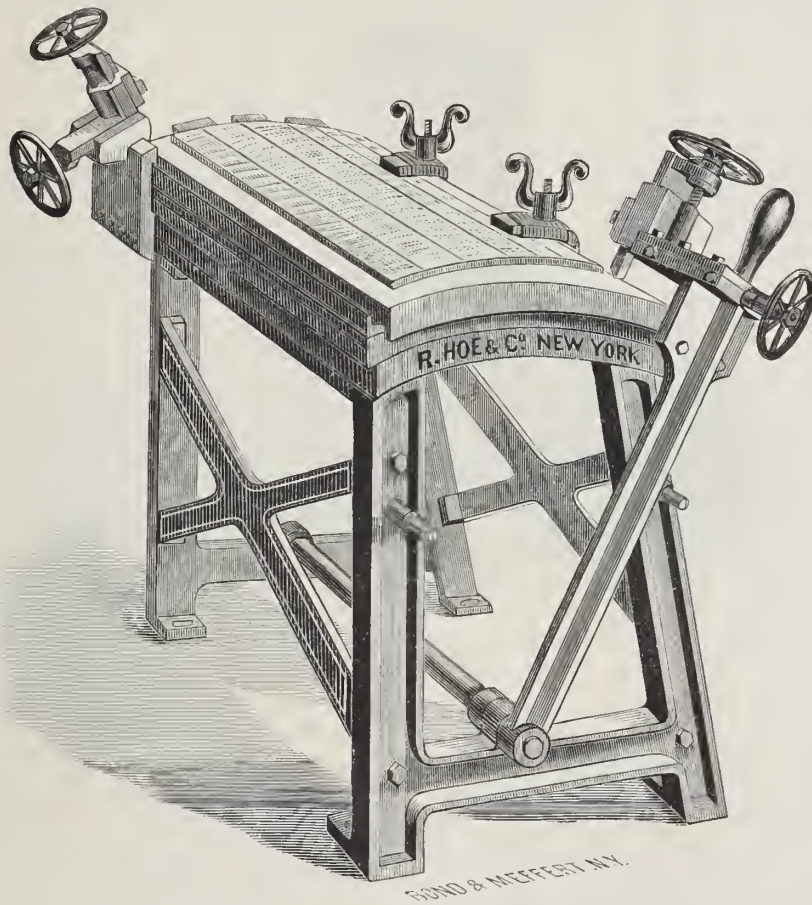
Prices of Iron Shoot-Boards.

9 × 15 inches, with one bevel and one side plane	\$35.00
18 × 32 inches, with one bevel and one side plane	40.00

MORTISING.

Mortised blocks are those which have the plate and block cut away in places to allow of type being inserted. Sometimes merely a small part of the edge

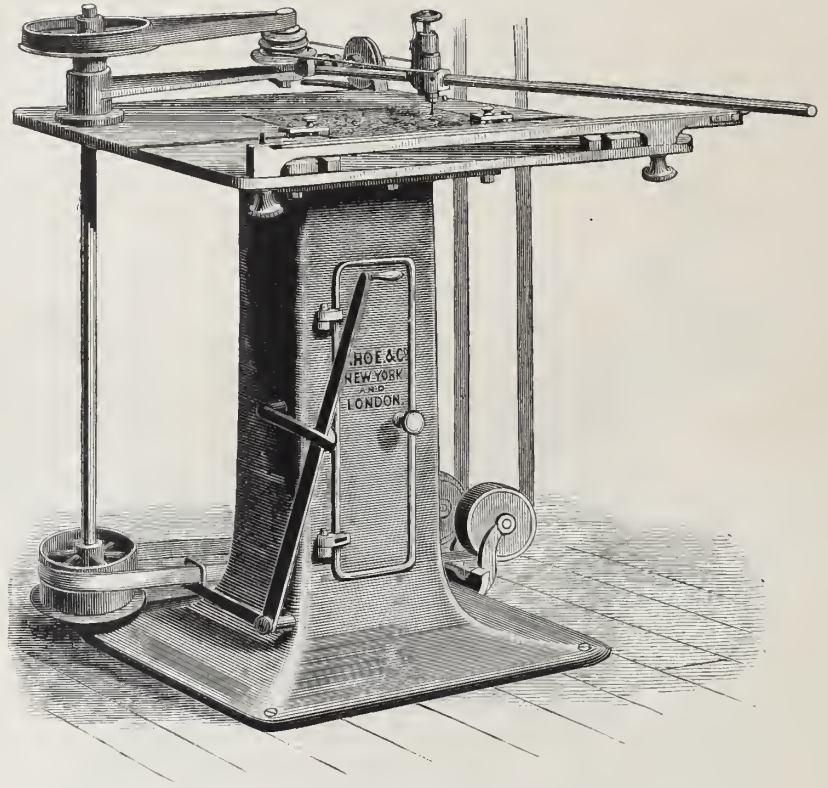
or corner is sawed out; sometimes only a small portion is left projecting. But frequently the removed portion is entirely surrounded with the block. To do this, a jig or "fret" saw with fine-strained blade is used. A starting hole is drilled and the outline of the mortise carefully followed with the blade, care being taken to make the cut true and smooth.



Stereotypers' Dressing Table for Newspaper Plates.
(Used on type-revolving presses.)

*Prices of Iron Tables for bevelling and cutting off curved plates.
Large curve, for rotary presses.*

No.	Size matter.	Price, by hand.	Price, by power.	No.	Size matter.	Price, by hand.	Price, by power.
4	15 × 20 inches	\$200.00	\$260.00	6	21 × 28 inches	\$225.00	\$285.00
5	18 × 24 inches	210.00	270.00	7	24 × 32 inches	245.00	305.00



Routing Machine.

Routing, or cutting out the blank spaces in plates, is effected by means of rotating steel cutters used in the machine shown above, which is the same as that used by wood-engravers.* Power is communicated to the upright shaft in the corner of the table, and thence by pulleys and belts to the steel cutters, which revolve seven thousand times a minute, and which, by means of the double lever, can be brought to any point with ease and precision. A spring rest prevents the tool from touching the plate till pressed down by the operator. The stand contains shelves for tools, etc.

*Routing Machine, for cutting out blank spaces in stereotype and electrotype plates.
To work by power. Will take on plate 22 × 28 inches.*

Price, with six cutters and upright shaft \$300.00

* Wood-engravers rarely rout out large spaces on their blocks, except where the original is to be printed from, as they prefer letting the stereotyper rout them out in the cast, or the electrotypist build the mould.

MOUNTING ON METAL.

Advertising blocks, newspaper heads, and many other pieces of work, are often mounted on metal instead of wood. To do this, an ingot is poured, and the backed electrotype or stereotype block is soldered to it, and the back then dressed off.

These blocks are poured in an adjustable ingot mould, formed by clamping together two plates, each with a side piece as high as the desired block. Very often the block has cavities or deep grooves cast in its under surface, to lighten it and make it stand squarely on its feet.



Fig. 1.

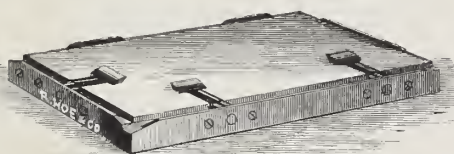


Fig. 2.

PLATE BLOCKS.

Unmounted plates (either electrotypes or stereotypes) are used on the press by being held on blocks of mahogany or iron, supplied with gripping pieces which clamp the plates firmly, and while bringing them up about type-height, enable them to be imposed and locked-up. Fig. 1 shows a plain old-style mahogany block with wrought-iron hooks (for cylinder presses), worked with a brass pinion. These should be made of the best heart boards, thoroughly seasoned, that they may remain true. Fig. 2 is a patent block of iron or wood.



APPENDIX A.

MATERIALS.

Nitric Acid—commonly called *aqua fortis*—keep cool.

Hydrochloric (and “chlorohydric,” “muriatic,” “spirits of salt,” and “smoking salts”) keep cool.

Black-lead (“plumbago,” “graphite”) get free from clay.

Sulphuric acid (“oil of vitriol”) keep dry. It is dangerous to pour water into this acid. Pour the acid slowly into the water (both cool), stirring the while.

APPENDIX B.

ANTIDOTES FOR POISONS, ETC.

GENERAL PRINCIPLES.

In cases of acid poisoning, the best antidotes are alkalies and earths. These should be followed by mucilaginous drinks. Soap in large quantities applies to all mineral acids. In cases of alkaline poisoning, vegetable acids prove the most effectual.

Keep the hands and arms as free from chemicals as possible, as the pores of the skin absorb them, and produce blood-poisoning, which is very often fatal. Never dip the arms in a chemical bath to recover anything dropped therein.

Where the hands have been burned by acid, bicarbonate of soda is the best antidote.

Lime water and olive oil should be applied to sores produced by cyanide of potassium, and the sores washed frequently in running water.

ANTIDOTES FOR POISONS.

Hydrocyanic acid (prussic acid)—Cyanide of silver, cyanide of potassium, or ammonia vapor, if promptly employed, is an antidote for prussic acid. Acetate or citrate of iron is also effectual.

Mercurial poisoning—Iron, white of egg. For corrosive sublimate, white of egg is most effectual.

Muriatic acid—Magnesia, soap.

Sulphuric acid—Carbonates, alkalies, earths, soap.

Nitric acid—Magnesia, soap in large quantities.

Ammonia—Vegetable acids.

Acetic acid—Vinegar.

Citric acid—Lemon juice.

Lead—Iodide of potassium, soluble sulphates.

Chlorine—White of egg, ammonia.

Nitrate of silver—Chloride of sodium (common salt).

When using cyanide of potassium to remove silver stains, add to its solution tincture of iodine; then it is more effectual, and much less harmful.

Hyposulphite of soda is weaker, but there is no danger in using it.

Acid stains may generally be removed by aqua ammonia.

APPENDIX C.

RELATIVE POWER OF BATTERIES.

The following experiments, made with electrodes double the size of the zinc plates of the batteries, all at equal distances (one inch) apart, will show the relative power of batteries. The time in action was one hour each; only one pair of plates constituted the battery.

	Deposited.		Deposited.
Grove's battery	104 grains.	Smee's battery	22 grains.
Single-cell battery	62 grains.	Wollaston's battery	18 grains.
Daniell's battery	33 grains.		

CONSTANCY OF BATTERIES.

But the first hour of the action of most batteries differs from an hour afterward, so that one kind of battery may be useful for a short time, and another sort if the action is to be continued for a length of time. The following table will illustrate this remark, the condition being the same as in last experiment, or the last experiment being continued, and the results taken every hour for seven successive hours:

	One hour.	Two hours.	Three hours.	Four hours.	Five hours.	Six hours.	Seven hours.	Total.
Grove's battery	104	86	66	60	54	49	45	464 grains.
Single-cell battery	62	57	54	46	39	29	24	311 grains.
Daniell's battery	33	35	34	32	32	30	31	227 grains.
Smee's battery	22	16	14	11	12	11	10	96 grains.
Wollaston's battery	18	14	15	12	11	10	10	90 grains.

To make this comparison more practical, larger plates were used for the battery, and proportionately larger electrodes, and the battery kept in operation until one pound of copper was deposited, renewing the acid and brushing the zines every twenty-four hours. The time taken to effect this was:

Grove's battery	19½ hours.	Smee's battery	147 hours.
Single-cell battery	45 hours.	Wollaston's battery	151 hours.
Daniell's battery	49 hours.		

RELATIVE INTENSITY OF BATTERIES.

Different batteries have different degrees of power to overcome resistance—greater intensity. The following experiments will illustrate this: A single pair of Wollaston's, Smee's, and Grove's batteries were fitted up as nearly equal in circumstances as the different arrangements would allow—each exposing the same surface of zinc, and connected with electrodes placed in a solution of sulphate of copper, first one inch, then two inches, three inches, and four inches apart—half an hour in each. They were then reversed, beginning with the electrodes at four inches, and coming to one inch. These experiments were repeated several times, and a mean of the whole taken. The results were:

Electrodes.	Deposited.		
	Wollaston.	Smee.	Grove.
One inch	8.8 grains.	12.0 grains.	31.0 grains.
Two inches	6.6 grains.	6.8 grains.	26.0 grains.
Three inches	4.7 grains.	6.0 grains.	17.0 grains.
Four inches	3.0 grains.	4.6 grains.	14.0 grains.

From this it will be seen that Wollaston's stands lowest in intensity, which is more apparent as the distance of the electrodes is increased. Smee's is one-third more than Wollaston's at one inch, and one half more at four inches, while Grove's is three and a half more than Smee's at one inch, but four and a half more than Wollaston's and three more than Smee's at four inches. If we take the mean of these results as a comparison of batteries, their value will stand as under:

One of Grove's equal to three of Smee's and to three and three-fourths of Wollaston's.

The following table gives the results of different batteries, arranged in series, kept in action the same length of time, namely, one hour. The battery plates were very small, the electrodes twice the size of the battery plates.

	One pair.	Two pairs.	Four pairs.	Six pairs.	Nine pairs.
Grove's battery	55	72	93	97	98
Daniell's battery	15	35	60	77	86
Smee's battery	11	19	29	41	58
Wollaston's battery	8	15	24	33	48

This table gives results approaching to and in principle the same as the others; it will be observed that one pair of Grove's is equal to nine pairs of either Wollaston's or Smee's. It is also worthy of remark that Grove's increases slowly in quantity above four pairs, the intensity being sufficient at four pairs to overcome the resistance offered to the current of electricity. For ordinary electrotyping, intensity arrangements are unnecessary, except when the article upon which the deposit is being made is of such a character as will not allow the positive electrode to be brought close to it, or when there are deep-cut objects, or any circumstance that increases distance and necessitates power to overcome resistance.

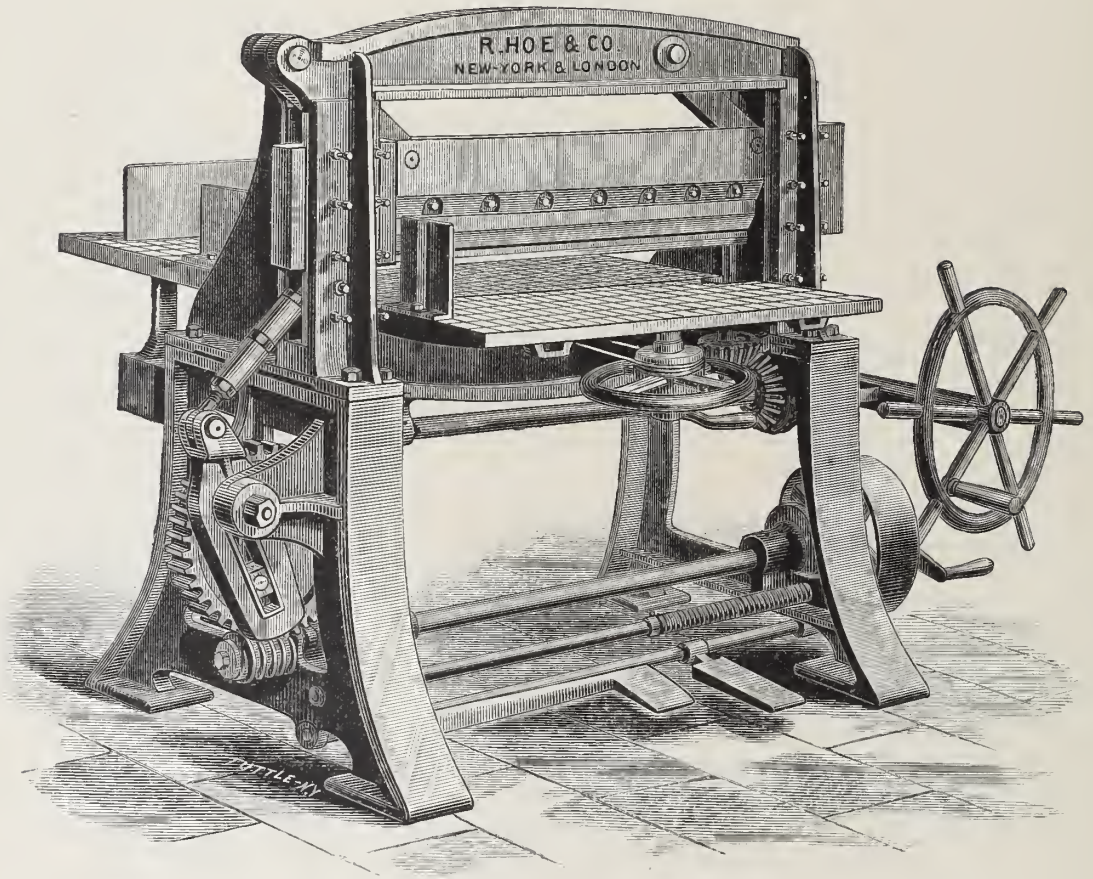
APPENDIX D.

PURITY OF THE ACIDS—TESTS FOR IMPURITIES.

The acids must be pure. Sulphuric acid is apt to contain nitric, which causes it to waste zinc and silver. To test, add a small quantity of indigo to sulphuric acid to be tested, and boil the mixture. If the color persists, no nitric acid is present.

The nitric acid used in Grove's batteries should be free from hydrochloric (muriatic), else it will ruin the platinum. To test for this, add two drops of solution of nitrate of silver to a dilute solution of the acid in rain-water. The presence of hydrochloric is shown by white cloud or milkiness, formed by the precipitation of the chloride of silver. Common oil of vitriol generally has sulphate of lead in it, which causes wasting of the zinc. Test: When one measure of the acid is added to five or ten of cold water, the mixture clouds. [Mem. Pour the acid slowly into the water, stirring all the while.]

BOOKBINDING.



PATENT POWER PAPER-CUTTING MACHINE.

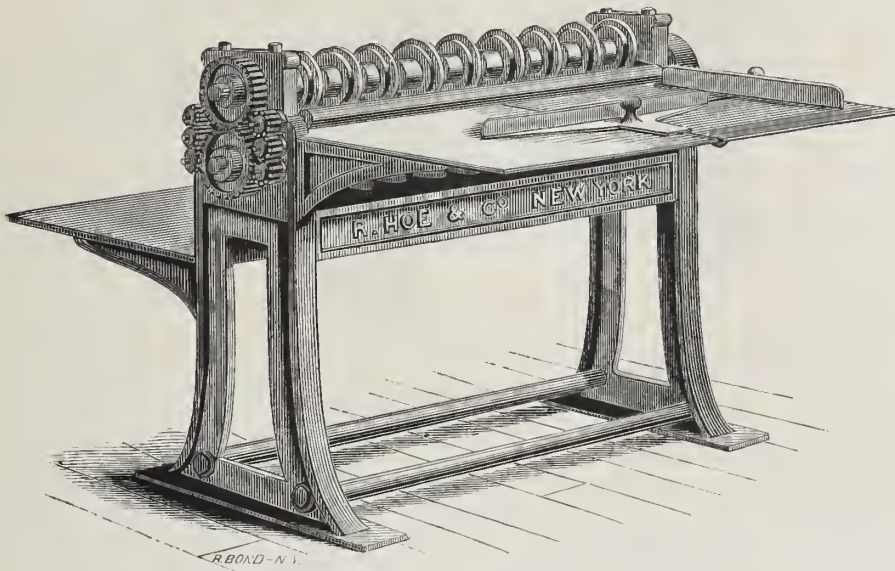
This is exceedingly strong, simple, and effective. Will cut the heaviest work with ease and precision. The knife is brought down obliquely to exactly the desired position by a crank motion, which returns it by a quick upward stroke, and then stops; and can be stopped and started at any part of the stroke by means of two treadles at the front of the machine. This insures perfect work, as the machine is always under control. It is adjustable in height, but requires no other regulating for the various kinds of work; is quickly taken off and replaced, and will stand at any point. The paper clamp is moved by screws, operated by a hand wheel at the front of the machine. The rear guide is moved by a screw and small hand wheel at the front of the table, and a side guide insures the cutting of the work perfectly square. This is the fastest and smoothest paper-cutting machine now manufactured.

For prices, etc., see next page.

Dimensions, Weight, and Prices of Power Paper-Cutting Machines.

No.	Width of paper cut.	Greatest space under knife.	Room occupied on floor.	Weight boxed.	Price.
1	24 in.	6 in.	4 ft. × 6 ft.	3,000 lbs.	
2	30 in.	6 in.	4 ft. 4 in. × 6 ft. 6 in.	3,250 lbs.	
3	36 in.	6 in.	4 ft. 8 in. × 7 ft.	3,500 lbs.	\$850
4	42 in.	6 in.	5 ft. × 7 ft. 6 in.	4,750 lbs.	950
5	48 in.	. .	. . . . .	. . . . .	1,100

Prices include boxing and shipping, or putting up in New-York.

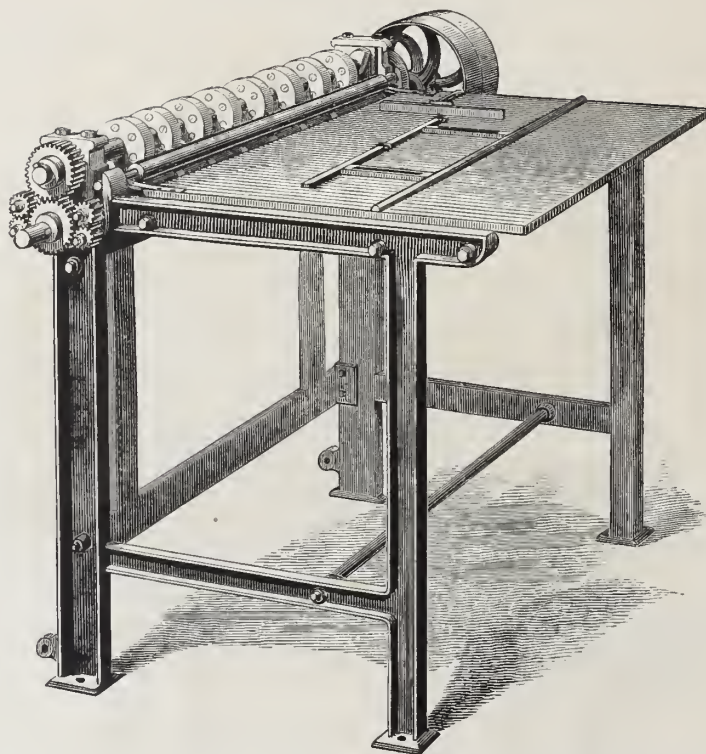
**CIRCULAR MILL-BOARD CUTTER.**

This is a strong and heavy machine for bookbinders' use. The shafts and cutters are of the best cast steel, and the table is of iron. The cutters are pressed together by adjustable springs, and have lubricating pads to prevent their chafing against each other. The work is placed against adjustable gauges on the table, and drawing rollers at each side insure accuracy of cut. A fast and a loose pulley are attached, so that no counter-shaft is required.

Dimensions and Prices.

No.	Width of board cut.	No. of pairs cutters.	Price.	No.	Width of board cut.	No. of pairs cutters.	Price.
1 . . .	24 inches.	7		3 . . .	36 inches.	9	\$575.00
2 . . .	30 inches.	8	\$450.00	4 . . .	42 inches.	10	650.00

Extra cutters, per pair: six-inch, \$20; eight-inch, \$30. Treadle, extra, \$30.



CIRCULAR CARD-BOARD CUTTER, SELF-FEEDING ATTACHMENT.

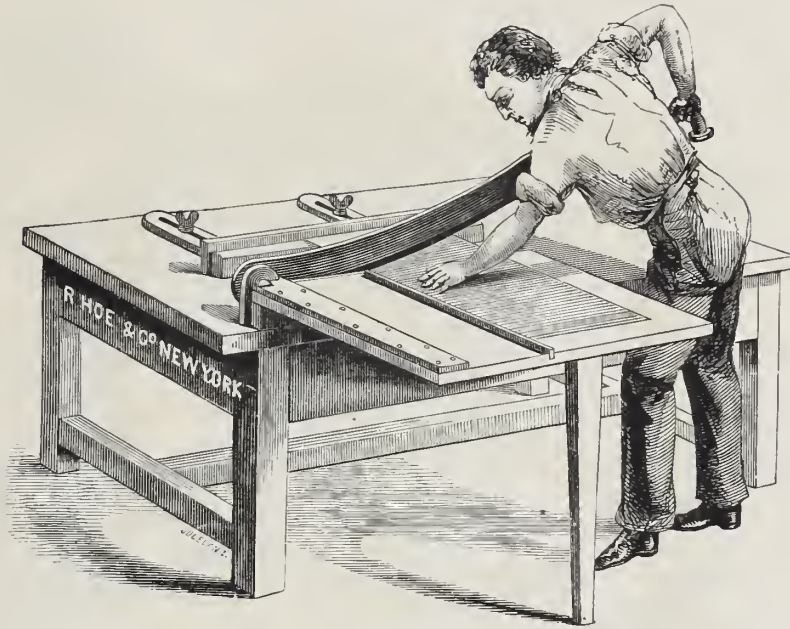
This machine is especially designed for cutting up card-board and similar material. The work is placed against adjustable gauges on an iron table. Drawing rollers at each side of the cutters insure accuracy; and an arrangement of carrying bands is added, when desired, for unusually small sizes. The cutters are made of the best cast steel, and tempered. The machine is arranged to run by steam power, but can also be worked by treadle, if required. It occupies a space of from three to four feet square.

Dimensions and Prices.

No.	Width of board cut.	No. of pairs cutters.	Price.	No.	Width of board cut.	No. of pairs cutters.	Price.
1 . .	24 inches.	7		3 . .	36 inches.	9	\$525.00
2 . .	30 inches.	8	\$450.00	4 . .	42 inches.	10	600.00

EXTRA CUTTING MACHINE KNIVES FOR HAND AND POWER PAPER CUTTERS.

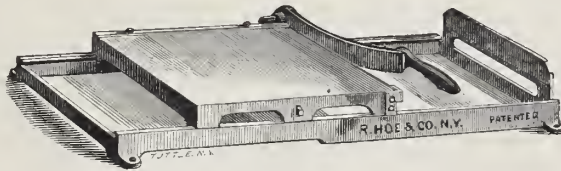
No.	To cut paper.	Each.	No.	To cut paper.	Each.
1	24 inches.		3	36 inches.	\$25.00
2	30 inches.		4	42 inches.	35.00



SHEARS AND WOODEN TABLE FOR MILL BOARD.

This table is strongly made, and is furnished with leaf and necessary gauges to insure accuracy. The shears are of best cast steel, and warranted.

No.	Length of shear blade.	Price.	No.	Length of shear blade.	Price.	No.	Length of shear blade.	Price.
1	24 inches	\$45.00	2	30 inches	\$65.00	3	36 inches	\$80.00

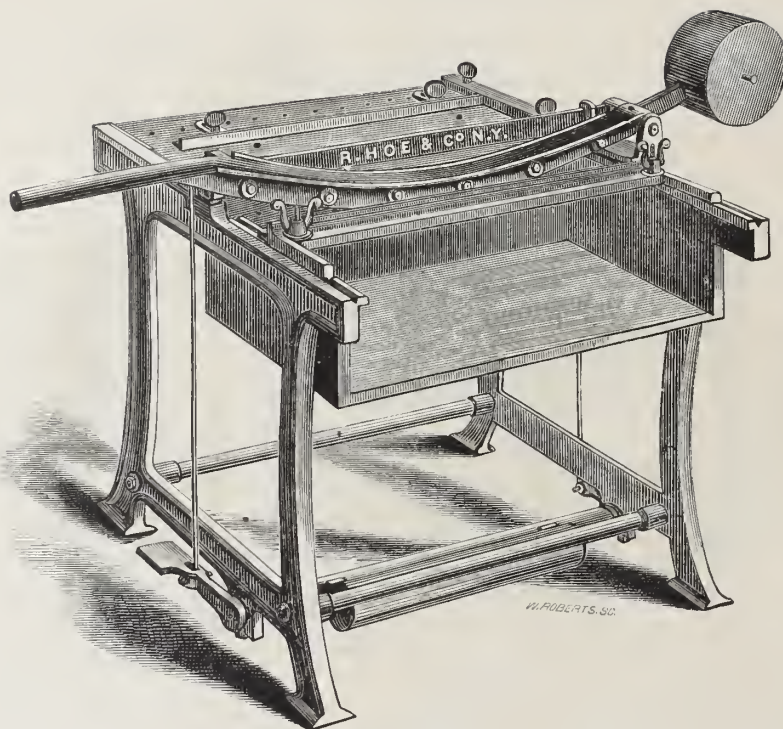


PATENT CARD CUTTER.

This cutter is entirely of iron and steel. The bed is so made as to slide on ways, and adjusted by a rack and pinion underneath. All parts are carefully fitted, and enable the operator to work with the greatest possible accuracy.

Sizes and Prices.

Size.	Price.	Size.	Price.
With six-inch shears . . .	\$15.00	With fifteen-inch shears . .	\$30.00
With eight-inch shears . .	18.00	With twenty-inch shears . .	37.50
With ten-inch shears . . .	22.50	With twenty-five-inch shears	47.50
With twelve-inch shears . .	25.00		

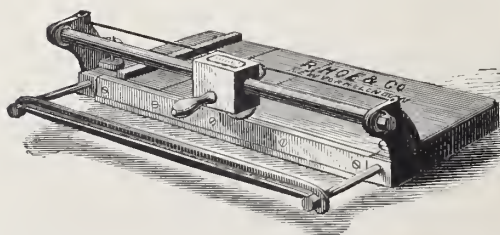


SHEARS AND IRON TABLE FOR MILL BOARD.

The frame and table are made of cast iron, and fitted up substantially. The table and gauges are planed true. The cutters are of cast steel, and can be adjusted by set screws, taken off to be reground, and, when worn-out, replaced at a trifling expense. A spring lever, which is brought down by a treadle, holds the board while cutting.

No.	Length of shear blade.	Price.	No.	Length of shear blade.	Price.	No.	Length of shear blade.	Price.
1	24 inches	\$125.00	| 2	30 inches	\$137.50	| 3	36 inches	\$150.00

Prices include boxing and shipping, or putting up in New-York.



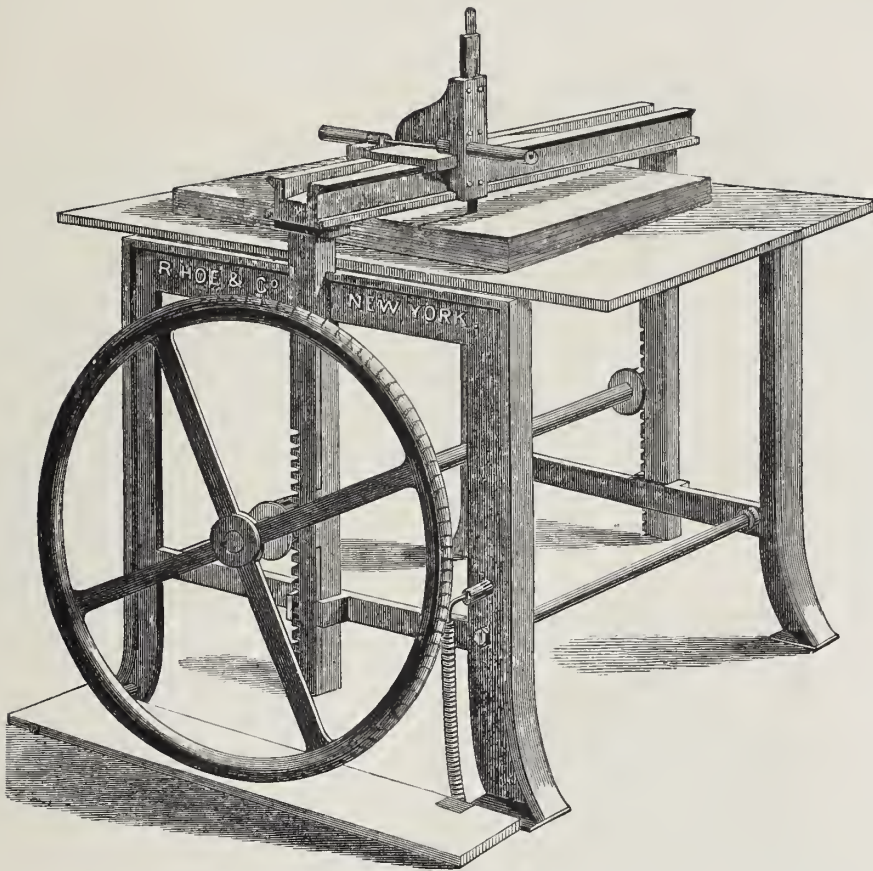
Rotary Card Cutter.

ROTARY CARD CUTTER.

This cut represents our rotary card cutter, which we have lately improved. It is substantially made, and is furnished with all the conveniences to make it a handy and useful machine.

Sizes and Prices.

Twenty-five-inch card-board, \$35.00; Twenty-eight-inch card-board, \$38.00;
Thirty-inch card-board, \$40.00.



PLOUGH-KNIFE PAPER CUTTER, WITH IRON FRAME.

This is the simplest form of the plough-knife machine, and is made entirely of iron, excepting the table. The plough slides on the cross head, being worked back and forth over the paper by hand, and any wear of the parts can be taken up by adjusting screws. The knife is fed down by double gearing. A small wheel, not shown in the cut, moves the table backward and forward, while the spring treadle locks the cross head fast in any position.

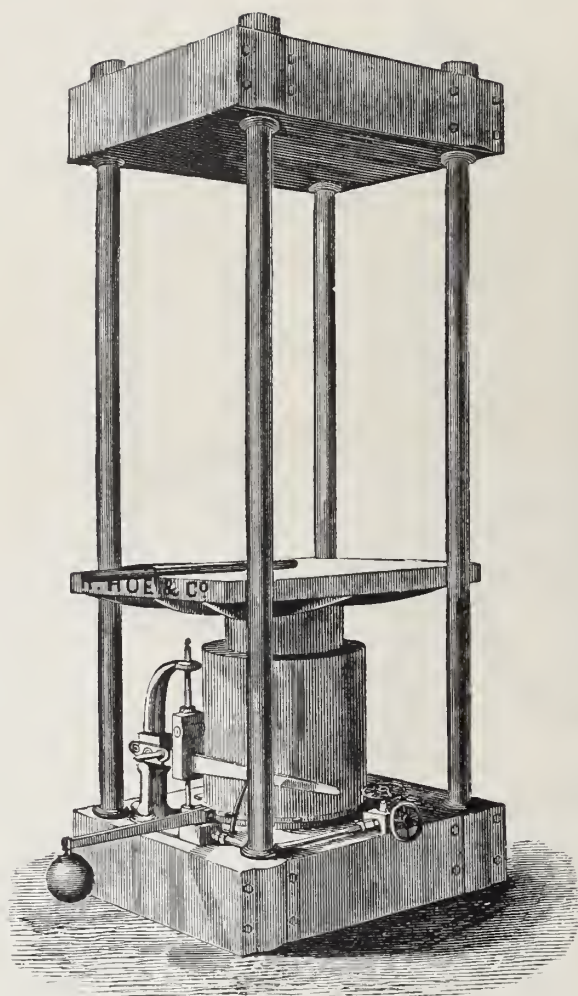
Width of paper cut . . 28 inches. | Price \$60.00

PLOUGH-KNIFE PAPER CUTTER, WITH WOODEN FRAME.

This machine resembles the one shown in above cut, but has the hand wheel placed horizontally under the board. The knife slides back and forth on the cross head, and is moved up or down by turning the handles. The cross head is brought down to hold the paper in place by means of the hand wheel. The stand is of hard wood, well put together.

Width of paper cut . . 28 inches. | Price \$50.00

Prices include boxing and shipping, or putting up in New-York.



HYDRAULIC PRESS, WITH PUMP ON BASE.

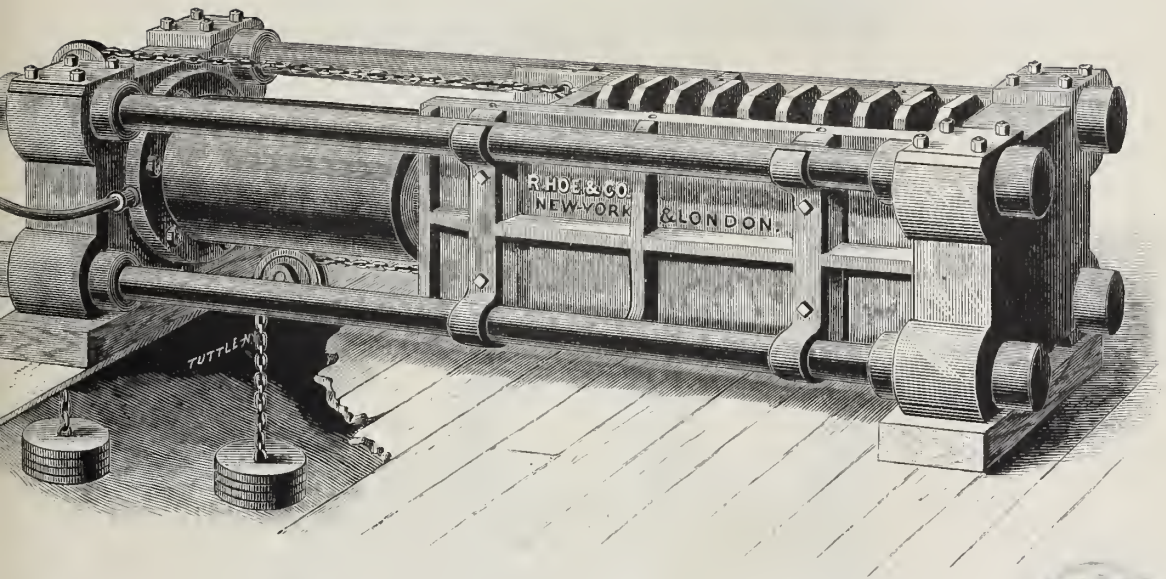
The cut shows the pattern used for pressing printed sheets; but we make them also for lead pipe, tobacco, cotton, oil, mustard, etc. The platen of press is furnished with grooves running into a faucet, which carries off the surplus oil. The cylinder is of solid wrought iron, and lined with copper. The rods are forged from picked scrap. The pump may be placed on the base of the press, as shown in the cut, or on a separate cistern. The cylinder should be wiped out from time to time, and the cistern frequently cleansed and supplied with pure water.

Hydraulic Press, with Pump on Base.

Dimensions and Prices of Paper Hydraulic Presses.

Diameter of ram.	Size of platen.	Greatest space between head & platen.	Length of rods.	Pressure obtained.	Price without pump.
Six in.	25 × 37 in.	48 in.	8 ft. 4 in.	140 tons.	\$700
Eight in.	26 × 40 in.	54 in.	9 ft. 2 in.	250 tons.	900
Ten in.	28 × 44 in.	66 in.	10 ft. 8 in.	390 tons.	1100
Twelve in.	32 × 47 in.	72 in.	11 ft. 8 in.	560 tons.	1450
Fourteen in.	35 × 51 in.	72 in.	12 ft. 3 in.	765 tons.	1900
Sixteen in.	38 × 55 in.	72 in.	12 ft. 9 in.	1005 tons.	2500

Other sizes and designs made to order.



HORIZONTAL HYDRAULIC PRESS.

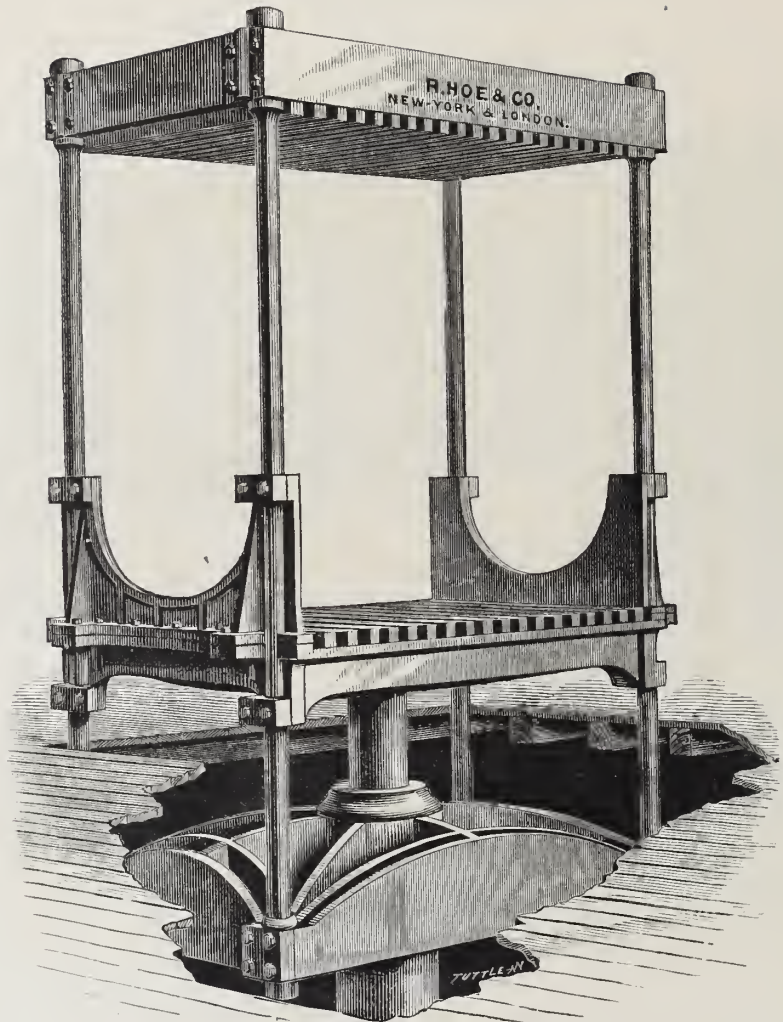
Used for pressing any seeds or material from which oil may be extracted. The cylinder is of solid wrought iron, and lined with copper. The rods are forged from picked scrap iron. Two heavy cast-iron frames, securely fastened to the rods with the head of the press, form the box or hopper for receiving the bags containing the seed, etc., and the twelve iron plates to go between the bags. The plunger is forced into the box by means of the ram of the cylinder. The ram is drawn back again to place by counter weights. A tank for catching the oil is furnished with press, and is placed directly under the hopper. This press is very strongly built, and will give a pressure of 390 tons.



HAND AND STEAM PUMPS.

	Price.
Single pump on base of press (as shown in cut, page 140) . . .	\$175.00
Single pump on separate cistern	225.00
Double pump on separate cistern	300.00
Double horizontal steam pump on separate cistern	600.00
Double vertical steam pump on separate cistern	1000.00

Counter-shafts, connections, and pipes, extra.

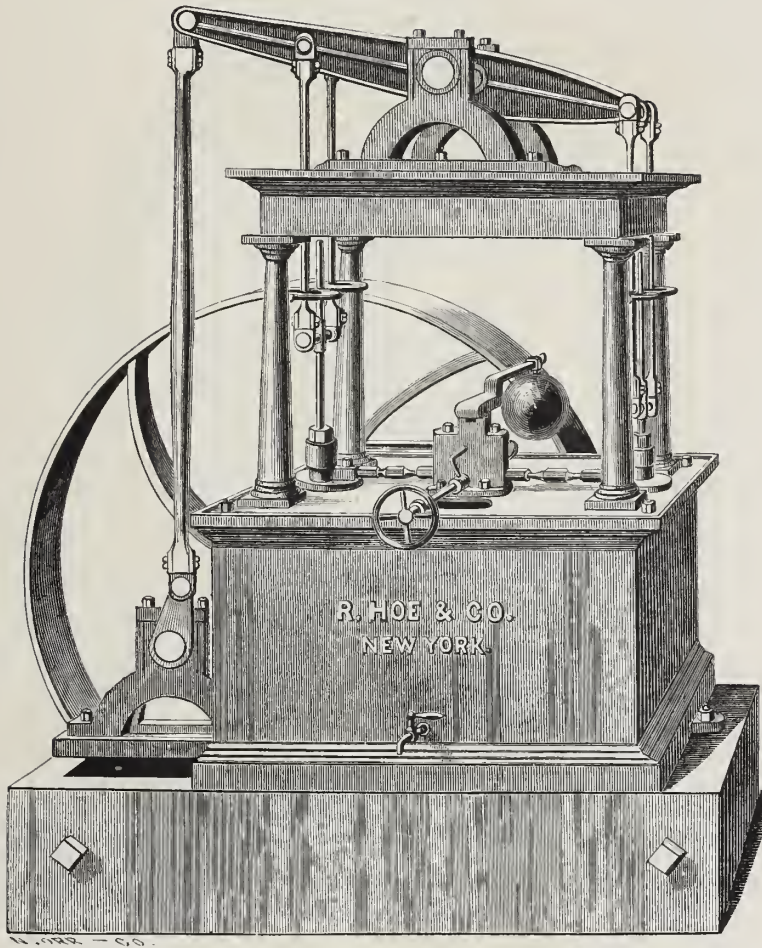


HYDRAULIC BALING PRESS FOR COTTON, HAY, ETC.

This cut represents a new pattern of hydraulic press used for baling cotton, bagging, rags, or any kind of merchandise. The ram and cylinder are placed below the floor, as shown in the cut, so that the platen of the press is on a level with it, and the goods to be baled are trucked into position, thus avoiding any heavy lifting. The platen and head of press are grooved, to allow the bands to be placed and fastened around the goods after they are sufficiently pressed. These presses can be made to do any kind of baling, and the one represented in cut is especially for pressing bags into bales, and is extensively used in this country. The cylinder of press is of solid wrought iron and lined with copper. The rods are forged from picked scraps.

Dimensions and Price of Baling Press.

Diameter of ram	6 inches.	Lift of platen	48 inches.
Size of platen	36 × 60 inches.	Pressure obtained	140 tons.
Greatest space bet. head & platen, 78 in.		Price, without pump	\$1000

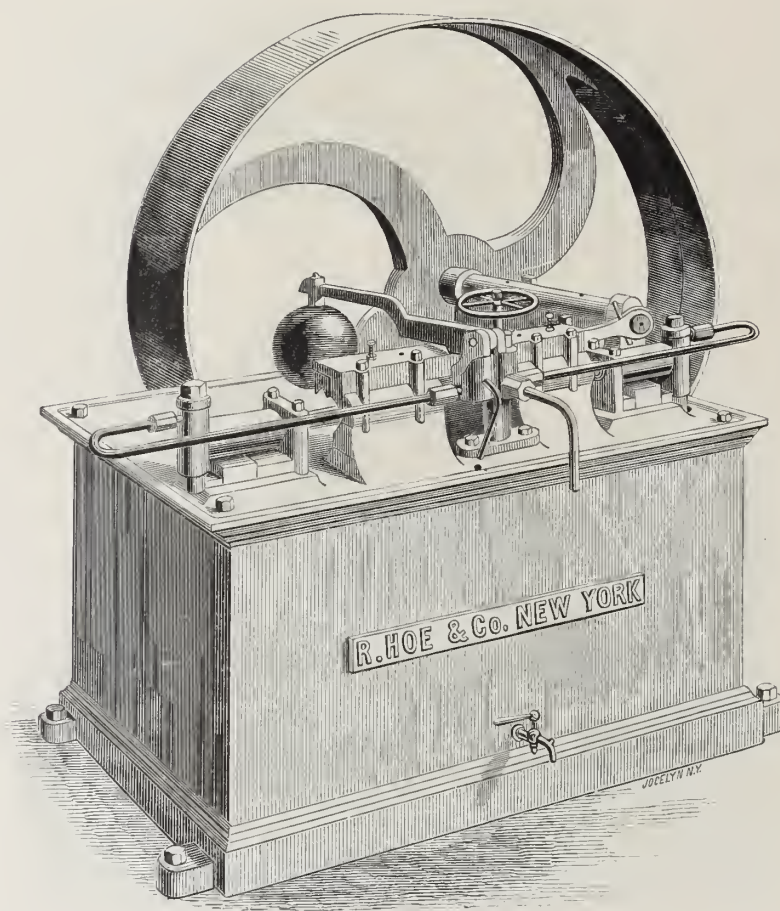


DOUBLE VERTICAL STEAM PUMP FOR HYDRAULIC PRESSES.

This pump is finished in the most thorough manner, and any number of presses may be operated by it by means of the proper connections. Running at its usual speed of fifty revolutions per minute, it will raise the platen of a twelve-inch hydraulic press at the rate of one inch and a half per minute. The cistern should be frequently cleansed and supplied with pure water.

Dimensions, Weight, and Price.

Space occupied on floor	4 feet × 6 feet 8 inches.		
Capacity of cistern	55 gallons.	Weight	2400 lbs.
Height	6 feet.	Price	\$1000

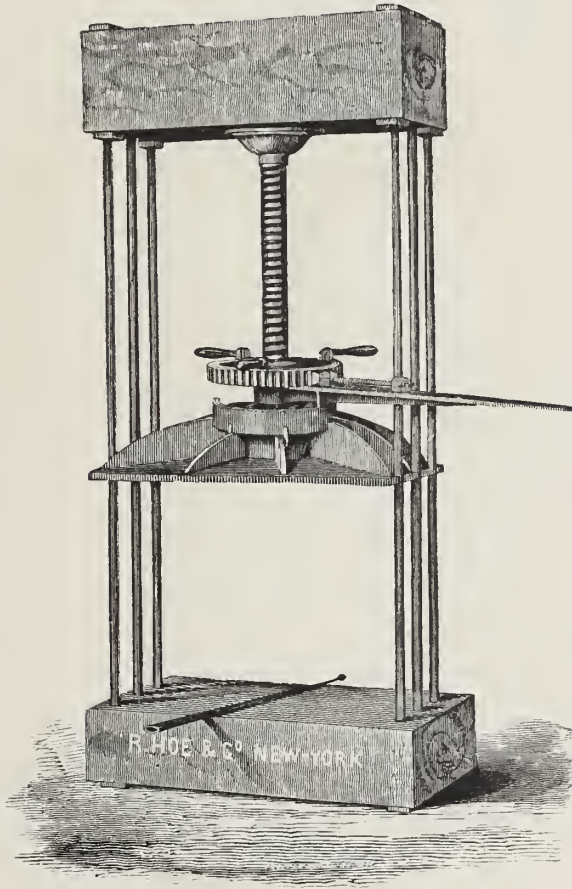


DOUBLE HORIZONTAL STEAM PUMP FOR HYDRAULIC PRESSES.

The action is simple and direct. The cylinders are in line on the water cistern, and the plungers fixed in a sliding head moving in an adjustable guide block. A number of hydraulic presses may be worked by this pump, which, at its usual speed of fifty revolutions per minute, will raise the ram of a twelve-inch press one inch and a half per minute. The cistern should be frequently cleansed and supplied with pure water.

Dimensions, Weight, and Price.

Room occupied on floor, 3 × 5 feet.	Capacity of cistern . . . 50 gallons.
Weight 1400 lbs.	Price \$600.00

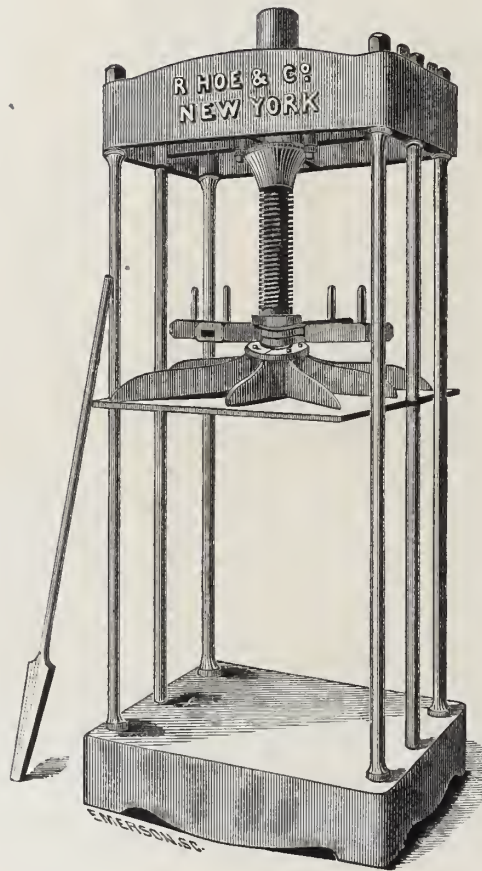


OAK STANDING PRESS.

The box is of brass; the platen planed true. The timber used is of the best quality, well seasoned, and secured by iron plates, bolts, and nuts. The gear is turned either by means of a nut with four sockets, or by a spring ratchet, shown in the cut.

Dimensions and Prices.

No.	Diameter of screw.	Size of platen.	Price with four-socket nut.	Price with ratchet wheel.
1	2½ inches.	17 × 21 inches.	\$75.00	\$82.50
2	3 inches.	19 × 24 inches.	125.00	132.50
3	3½ inches.	24 × 29 inches.	162.50	170.00
4	4 inches.	26 × 34 inches.	262.50	270.00

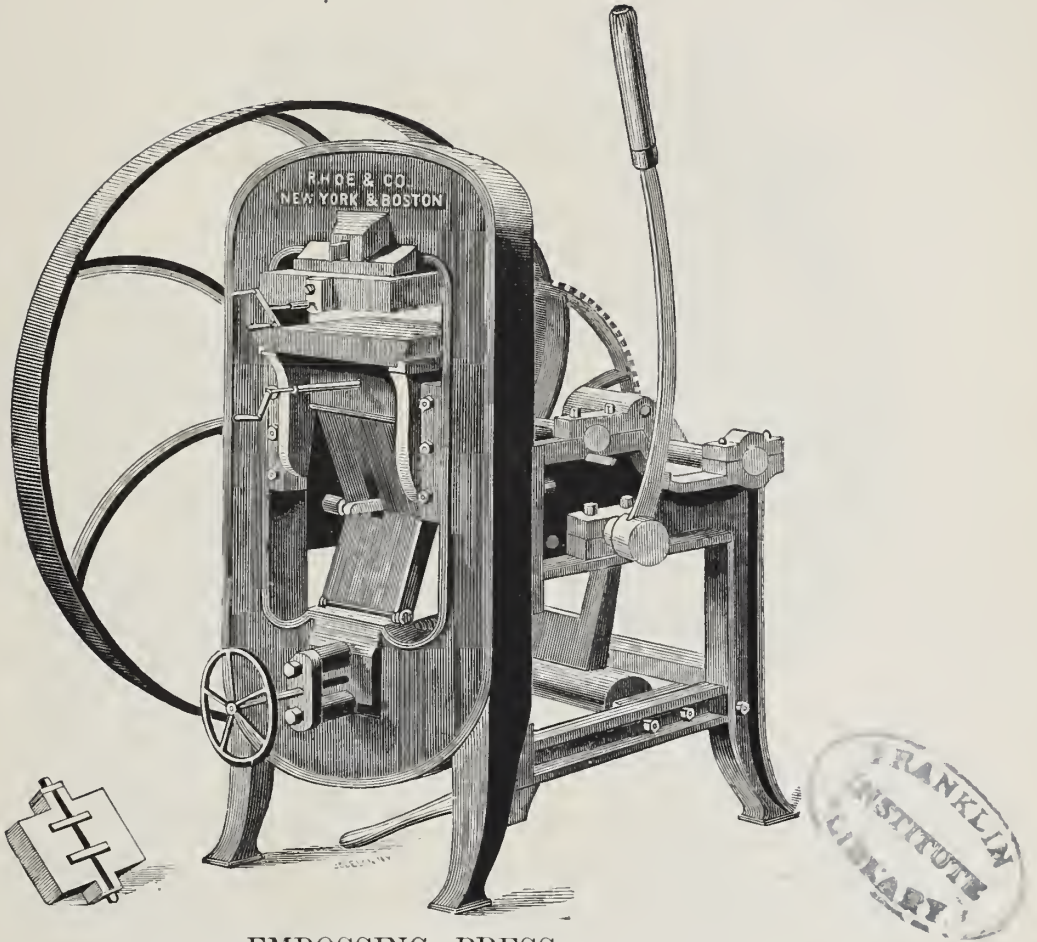


IRON STANDING PRESS, WITH BRASS BOX.

This is entirely of iron, except the brass nut. It is made to work as desired, either with a spring ratchet or with the four-socket nut shown in the cut. The screw is covered by a tin box.

Dimensions and Prices.

No.	Diameter of screw.	Size of platen.	Price with four-socket nut.	Price with ratchet wheel.
1	2½ inches.	17 × 21 inches.	\$75.00	\$82.50
2	3 inches.	19 × 24 inches.	125.00	132.50
3	3½ inches.	24 × 29 inches.	162.50	170.00
4	4 inches.	26 × 34 inches.	262.50	270.00



EMBOSSING PRESS.

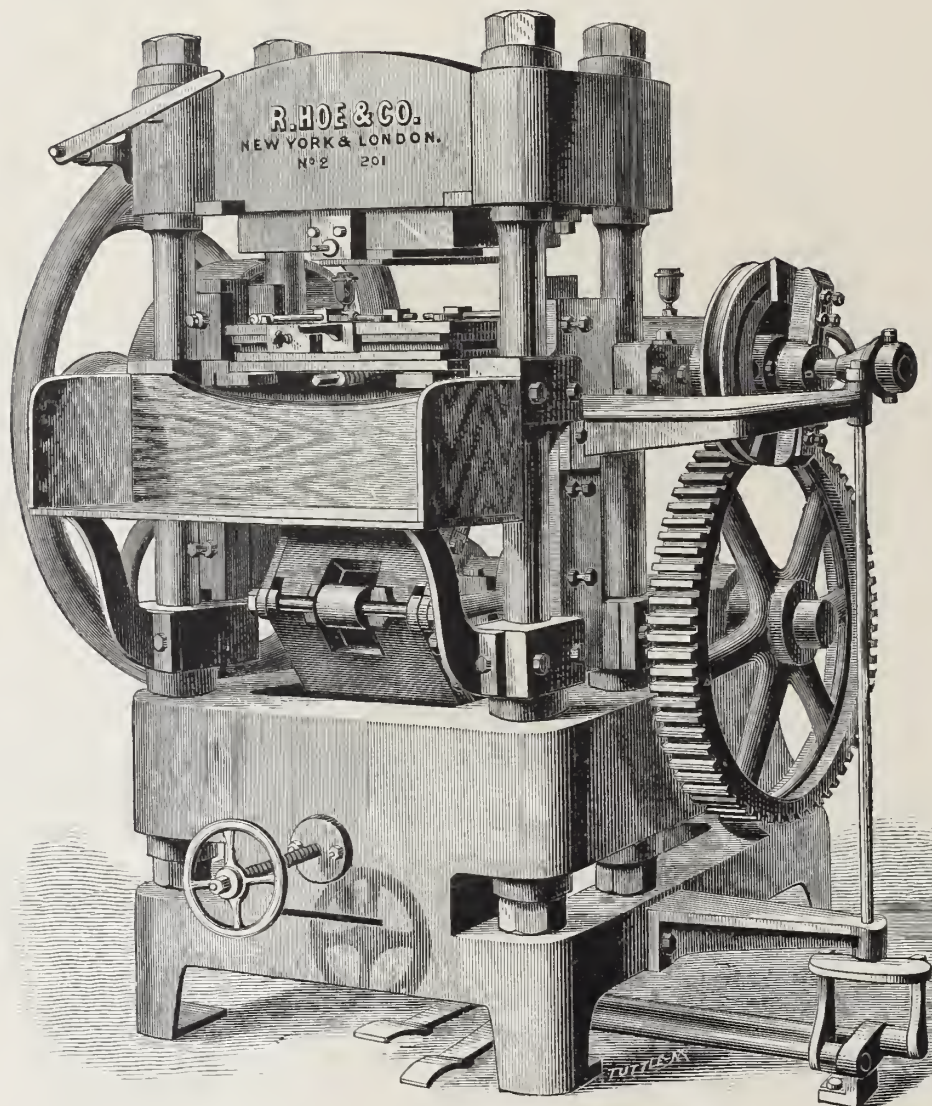
This machine is massive in structure, simple and efficient in operation. The cut represents the No. 2, which may be advantageously used with the hand lever. The No. 3 is similar in form, but is double geared, and has a fly-wheel on each end of the driving shaft. The No. 4 is of immense power, and corresponding strength.

Dimensions and Prices.

No.	Size of head.	Room occupied on the floor.	Weight boxed.	Price.
1	10 × 12 inches.	4 × 5 feet.	2,000 lbs.	\$600
2	15 × 17 inches.	4½ × 5½ feet.	3,360 lbs.	900
3	19 × 24 inches.	5½ × 6½ feet.	8,000 lbs.	1,200
4	24 × 30 inches.	6 × 7 feet.	11,500 lbs.	1,750

Printing attachment about \$300 extra for each of the above sizes.

Hand attachment about \$50 extra.



NEW EMBOSSEING PRESS.

The cut on this page represents our embossing press, which has been entirely remodelled, and its general efficiency greatly increased.

This press is massive, and strongly put together.

The bed is guided by the frame, so that a heavy impression can be had at either corner of the platen without tilting.

The feed guides on bed are adjustable in either direction, and specially adapted to good color work.

In this press we have done away with the cam for driving the toggle, and substituted a crank motion which is noiseless; and, by means of a

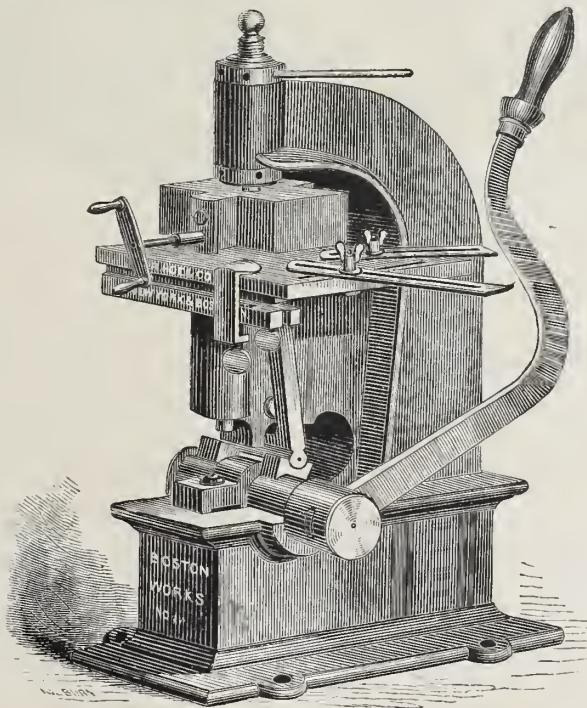
patent friction clutch, operated by treadles, the bed can be stopped and started without reverse or jar. This is an entirely new feature with a machine of this description.

The bed is constantly in motion; and, in order that no time may be lost, it is given sufficient travel to enable the operator to place on and take off the work without stopping the machine and without danger to the operator.

The inking attachment, which is furnished with press when desired, is simple and complete, and consists of an ink fountain with an adjustable knife, two form rollers and five distributing rollers, with a distributing cylinder, making it specially adapted for doing, at one operation, the heaviest kind of stamping and inking.

Dimensions and Prices.

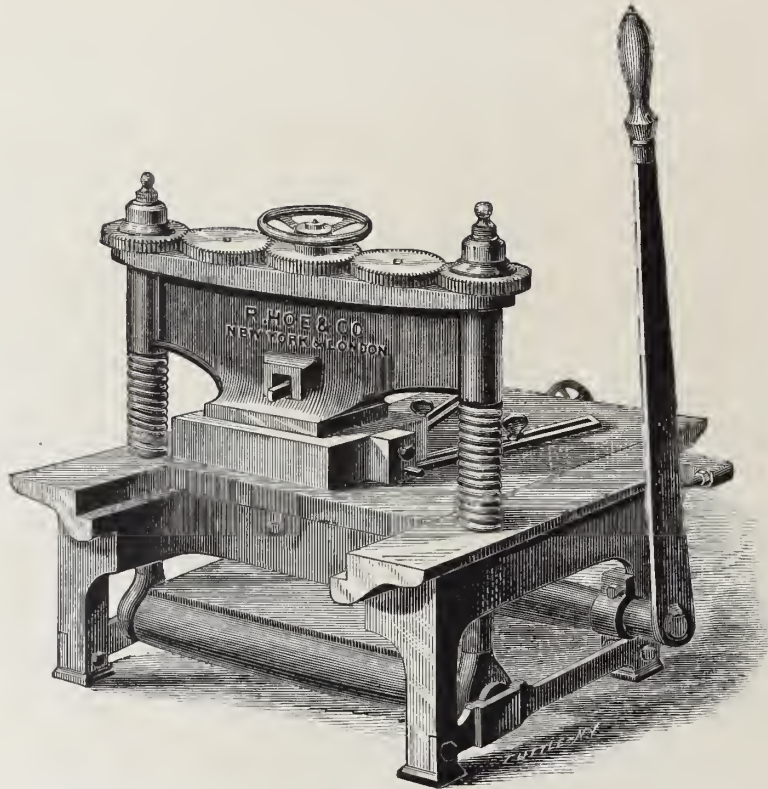
Size of head . . .	12×18 inches.	Price, with inking attach-	
Size of bed . . .	13×18 inches.	ment	\$1500
Largest work that		Price, without inking attach-	
can be taken on .	12×18 inches.	ment	1200



HALF ARCH GILDING PRESS.

This is exceedingly convenient for light work, as the bed is open on three sides, and has a forward, backward, and lateral motion, while the jaws of the head may be worked from the front or from either side.

Size of head	5×8 inches.
Price	\$150.00 | Weight, boxed . . .



EMBOSSING AND GILDING PRESS, WITH FIXED OR SLIDING BED.

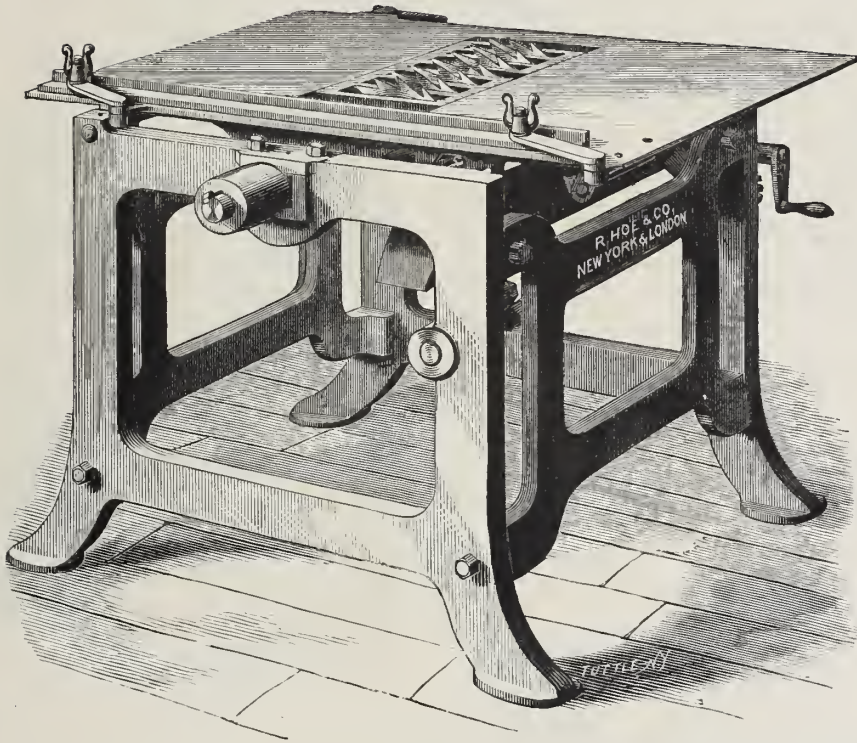
This is a powerful, yet simple, hand press for job work. The head has jaws screwing together from the sides, and is intended to be heated by steam, but may be adapted to gas or hot irons, if ordered. Adjustable side and end gauges are furnished, by which to set the work. The impression is regulated by the nuts on the top of the press.

Dimensions and Prices.

Price, with sliding bed, head 7×11 inches	\$350.00
Weight, boxed, 970 lbs.	
Price, with fixed bed, head 5×8 inches	\$175.00
Weight, boxed, 500 lbs.	

BOOK PRESSING OR SMASHING MACHINE.

This machine is on the same plan as the embossing press (page 147), but it has a cam of different shape, is arranged to run slower, and has a wider space between the head and bed. It is used for compressing books, and may be adjusted to all ordinary thicknesses. The prices, weights, etc., are the same as those of the embossing press, shown on page 147.



BOOK-SAWING MACHINE, TO WORK BY POWER.

The table is hinged to the frame of the machine, which is all of iron, and is held up out of the way by a counterbalance, while the saws are being changed. It is adjusted for sawing from both ends, and by this means a great nicety is attained in regulating the depth of the saw cut. It has also an adjustable side gauge. The brass sliding frames, or trucks, are easily set, and can be used for any sizes of books.

The mandrel is of steel, so arranged that there can be no side play, and the saws can be taken from mandrel without lifting it from its bearings.

There is furnished, when desired, a light wood and iron box, arranged to be guided by the table, on which the books are placed and securely held by an adjustable spring and catch, before being passed over the saws.

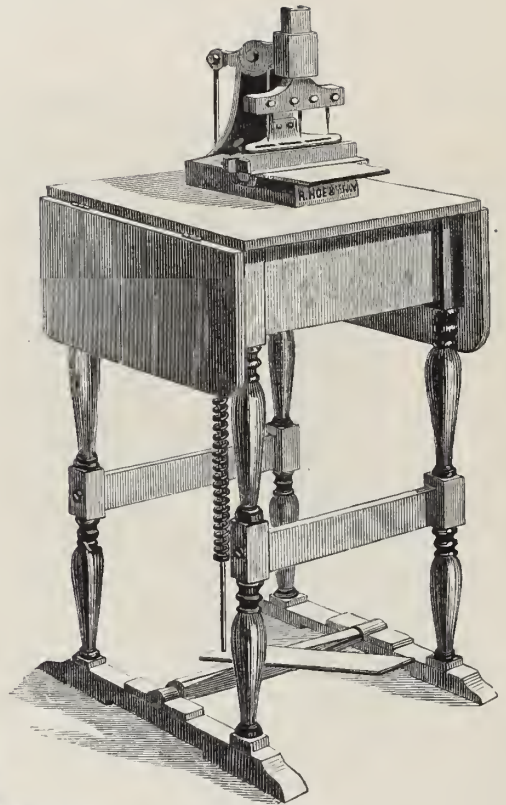
Two sets of saws of four and six each, washers for regulating width of cut, and counter-shaft and hangers, go with each machine.

PIERCING OR STABBING MACHINES.

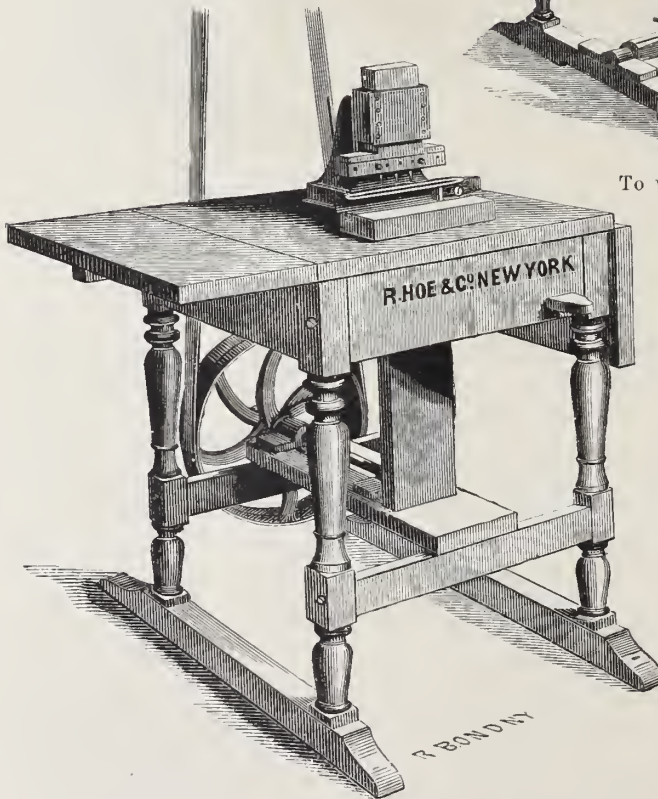
These machines, for pamphlets and similar work, are simple and durable. The clamp which holds the needles is so made that they can be changed in position, and the number increased or diminished, in a few seconds.

FOOT STABBING MACHINE.

Wood stand \$60.00



To work by foot.

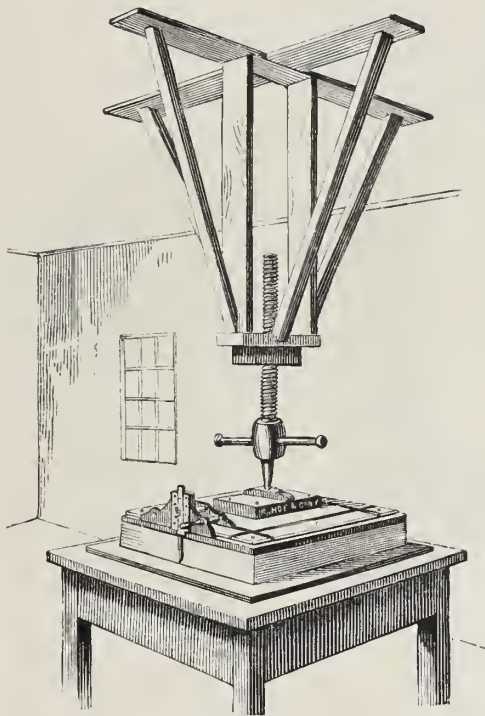


POWER STABBING MACHINE.

Wood stand,
very strong, \$125.00

Prices include three
awls.

PIERCING OR STABBING MACHINE, TO WORK BY STEAM POWER.



BOARDS AND PLOUGH FOR SQUARING PAPER.

The boards usually furnished are respectively 13×16 inches, 15½×19½ inches, 17×21½ inches, and 19×27 inches, but the sizes can of course be varied, as desired.

Price of plough, with knife and four boards; wood screw for plough,	
with nut and iron point	\$48.00
Table of hard wood, extra	15.00
Boxing and carting, extra	2.00

The above prices do not include the wooden frame by which the nut for the screw is held in place.

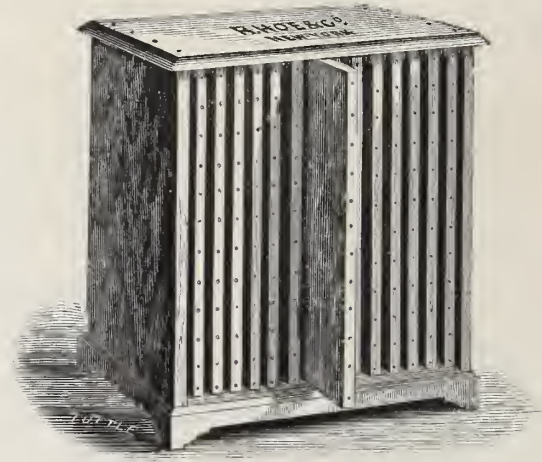
IMPROVED CUTTING BOARD.

It is made of many small pieces of the best kiln-dried maple or beech, thoroughly clamped together, and in such a manner that only the end wood is used for cutting upon. It is the most durable board that is made, is not affected by variation of temperature, and always remains perfectly true.

Price per face measure of end wood:

Board 2¼ to 2½ inches thick 2½ cents per square inch.





BRASS-BOUND BOARDS AND CASE FOR MUSLIN WORK.

These boards are made of the very best seasoned cherry, and warranted perfectly true. The brass border is made with bevelled or folded corners, and of hard brass. The case is made of hard wood, handsomely finished.

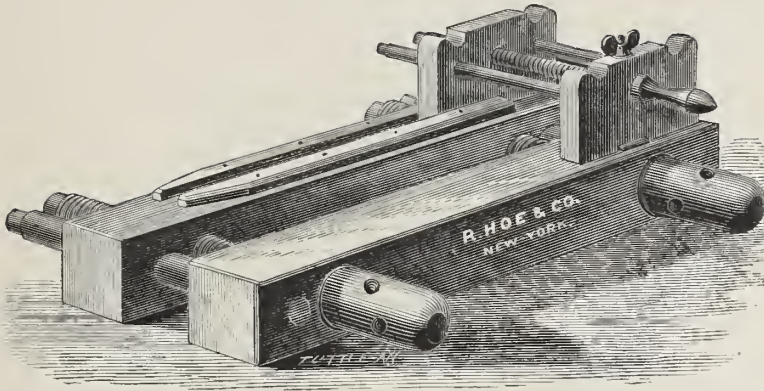
	Each.		Each.
Boards 16 × 24 inches, for		With lapped corners . . .	\$3.50
muslin work	\$3.25	Case to hold fourteen boards	4.00

SUPERIOR PLANISHED TIN BOARDS, FOR LEATHER.

In sets of fourteen boards.

No.	Size of board.	Each board.	No.	Size of board.	Each board.	No.	Size of board.	Each board.
1	7½ × 12 in.	\$2.50	2	12 × 16 in.	\$3.75	3	13 × 19½ in.	\$3.75

Case for a set of fourteen boards \$4.00



BINDERS' PRESS AND PLOUGH.

The cheeks and plough frames of these presses are made of beech, and the screws of hickory, all thoroughly seasoned and kiln-dried.

Press and plough, complete																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																</
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GILDING PRESS AND STAND.

This press is similar to the above cut, with the exception that there is no plough, and the screws are of metal, with gun-iron boxes. When desired, a substantial stand is furnished with press.

Sizes and Prices.

No.	Length of iron screws.	Diameter of iron screws.	Size of wood.	Price.
1	35 inches.	1 $\frac{3}{4}$ inches.	5 $\frac{1}{2}$ \times 5 $\frac{1}{2}$ inches, iron boxes.	\$35.00
2	35 inches.	2 inches.	6 $\frac{3}{4}$ \times 5 $\frac{3}{4}$ inches.	45.00

Stand for gilding press, \$9.

FINISHING PRESSES.

Length of press.	Space between screws.	Price.	Length of press.	Space between screws.	Price.
21 inches.	14 inches.	\$2.50	31 inches.	24 inches.	\$3.25
25 inches.	18 inches.	2.75	35 inches.	28 inches.	3.50
28 inches.	21 inches.	3.00	38 inches.	31 inches.	3.75

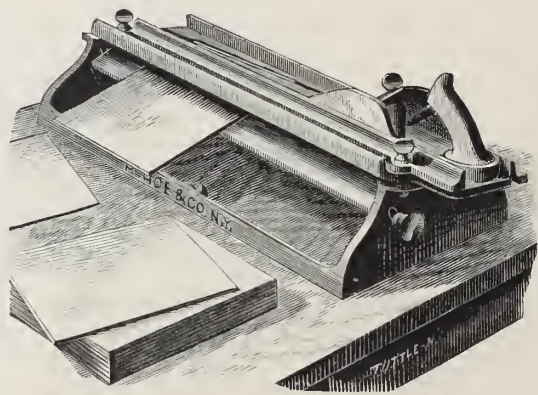
FINISHERS' STAND TO ATTACH TO TABLE.

Small size	\$5.00 Large size	\$5.00
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FINISHERS' STOVES.

Round furnace for gilt work	\$12.00
Single stove for blank work, \$20.00 Double stove for blank work,	30.00



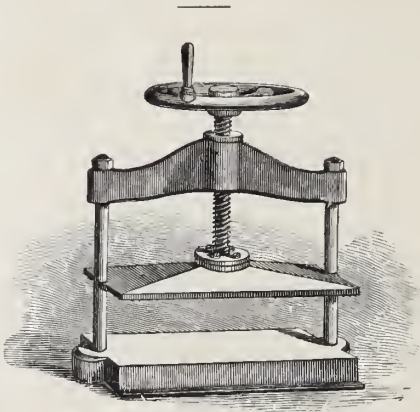


PATENT MACHINE FOR BEVELLING BINDERS' BOARDS.

This machine is entirely of iron, except the knife, which is of the best plane steel. The plane runs in an oblique channel, so as to use the whole edge of the knife, and to give a shearing cut down the grain of the board. The groove should be set to just the thickness of the work. The table is adjustable, to give any required bevel. The front gauge, or stop, is formed by the farther edge of the groove; the end gauge is movable on the table.

Price, with six knives \$90.00

Price includes boxing and shipping, or delivery in New-York.



IRON TABLE STANDING PRESSES.

These presses are screwed to the table to hold work glued or pasted until dry enough to lay aside. The yoke and rods are of wrought iron.

No.	Size of platen.	No. of rods.	Price.	No.	Size of platen.	No. of rods.	Price.
1	7½ × 15 inches.	2	\$25.00	2	16 × 24 inches.	4	\$35.00

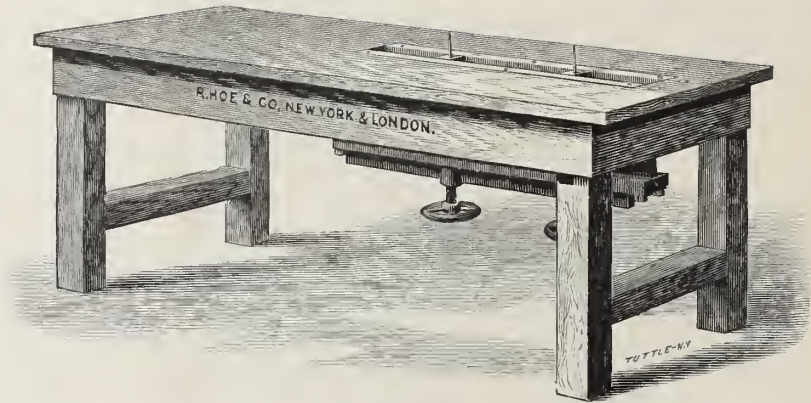


BACKING MACHINE.

Our bookbinders' backing machine, as shown in above cut, is an economical addition to large bookbinding establishments. It is adapted to back blank books from one-fourth to four inches wide, and thirty inches long and under. The revolving backing iron is hollow, and is heated from the centre by gas or steam. On the right of cylinder, as shown in cut, is the adjusting lever, and here also, by a simple device, the cylinder is secured for work on the groove desired.

Price \$200.00

Price includes set of fifteen wood dies.



SHEET-POINTING MACHINE.

Above is cut of sheet-pointing machine, for preparing printed sheets for cutting. The needles are adjustable to suit the perforations made by points in process of printing; and when a sufficient number of sheets are placed, they are drawn down, leaving the paper ready for the cutting machine.

Price, with table






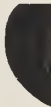



CHERRY PRESSING BOARDS.

They are made of the best kiln-dried cherry or maple, and in the most perfect manner. The ends of the boards are feathered, so that they are always kept straight.

Size.	Price.	Size.	Price.
6 × 10½ inches	\$.35	20 × 28 inches	\$1.30
8 × 10½ inches . . . . .	.40	24 × 32 inches	1.55
10 × 13 inches . . . . .	.50	24 × 38 inches	2.25
10 × 16 inches . . . . .	.70	28 × 38 inches	3.00
12 × 18 inches . . . . .	.75	30 × 36 inches	3.00
13 × 20 inches . . . . .	.80	26 × 40 inches	3.00
17 × 22 inches	1.00	28 × 44 inches	4.00
20 × 24 inches	1.10	Other sizes in proportion.	

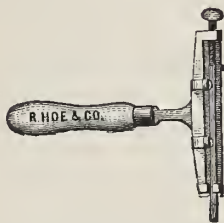
Maple boards, ten per cent. extra.

BOOKBINDERS' MATERIALS.

 No. 1. Quarto.	 No. 4. Medium.	 No. 7. Demy.
 No. 2. Cap.	 No. 5. Super Royal.	 No. 8. Medium and Royal.
 No. 3. Demy.	 No. 6. Cap.	 No. 9. Imperial.

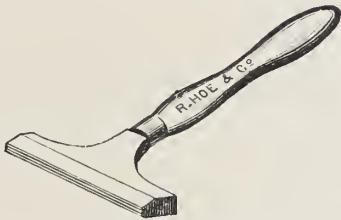
JOINT RODS FOR BLANK BOOKS.

Price, per dozen 75 cents.



PALLET.

Price \$5.00



BURNISHER.

Price \$4.50



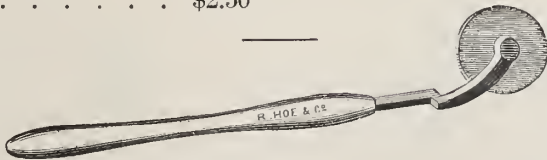
AGATE BURNISHERS.

Price, each \$2.50



STEEL POLISHER.

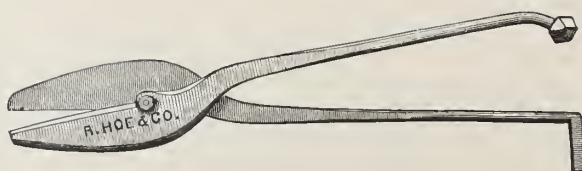
Price \$4.00



GILDING ROLL.

Price \$6.00





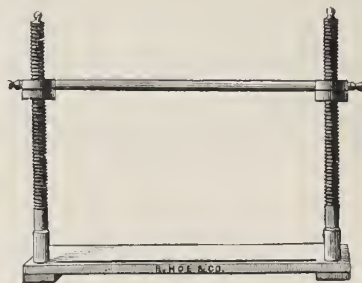
SQUARING SHEARS.

Price, per inch of cutting edge \$1.75



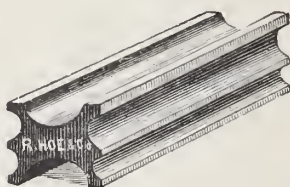
BACKING BOARDS.

Length.	Price.
10 inches	\$1.20
12 inches	1.44
14 inches	1.68
16 inches	1.92
18 inches	2.16
Other sizes, 12 cents per inch.	



SEWING BENCH.

No.	Space between screws.	Price.
1	24 inches.	\$2.00
2	30 inches.	2.50
3	36 inches.	3.00



BACKING IRON.

Price \$2.00

GOLD CUSHION, WITH
DRAWER.

Dimensions.	Price.
7 × 13 inches	\$3.50
8 × 16 inches	4.50
9 × 18 inches	5.50



BACKING HAMMER.

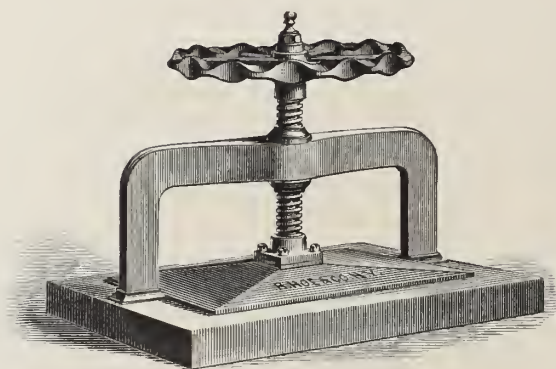
Price \$2.00



BEATING HAMMER.

Price \$2.50

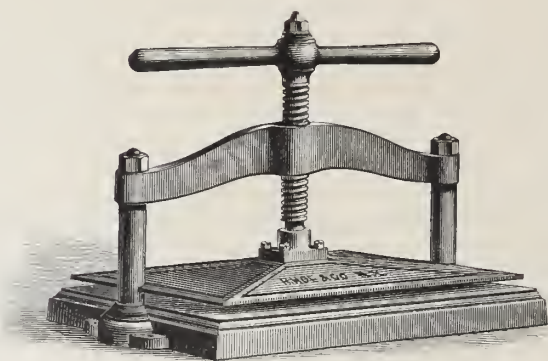
COPYING PRESSES.



FRENCH PATTERN.

Finished with great care. Boxes and steps of brass.

No.	Size of platen.	Price.	Boxing.	No.	Size of platen.	Price.	Boxing.
3	11 × 16 inches	\$40.00	\$.75	5	15 × 20 inches	\$65.00	\$1.50
4	12 × 18 inches	45.00	1.00	6	20 × 25 inches	85.00	2.50



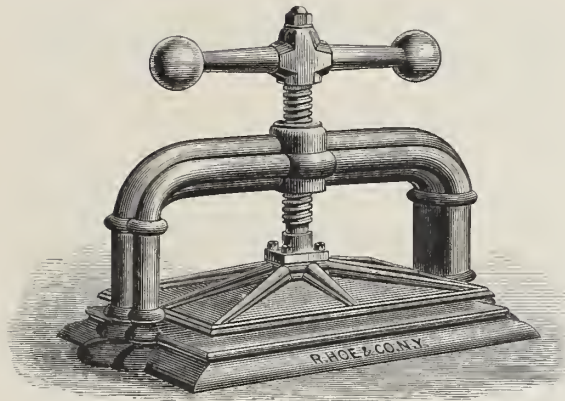
ENGLISH PATTERN.

Light, strong, and handsomely finished.

No.	Size of platen.	Price.	Boxing.	No.	Size of platen.	Price.	Boxing.
2	10 × 13 inches	\$25.00	\$.60	4	12 × 18 inches	\$40.00	\$1.00
3	11 × 16 inches	30.00	.75				

WROUGHT IRON YOKE COPYING PRESSES.

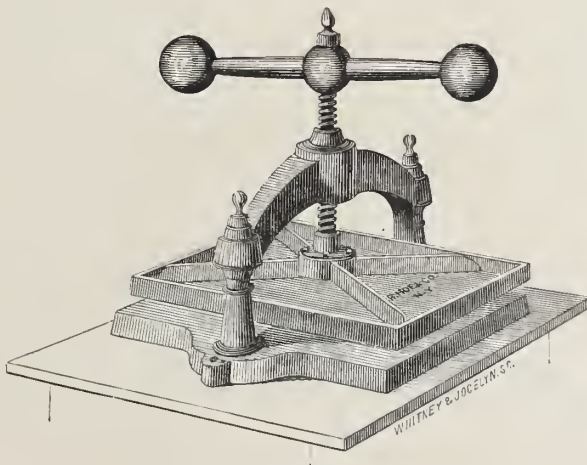
The above can be made either with the bar handle or the patent wheel.
Japanned balls, extra, \$5; nickel-plated balls, extra, \$10.



GOTHIC PATTERN.

No.	Size of platen.		Price.	Boxing.
2	10 × 13 inches	. . . . .	\$15.00	\$.60

Iron stand for press, \$13. Boxing, 75 cents.

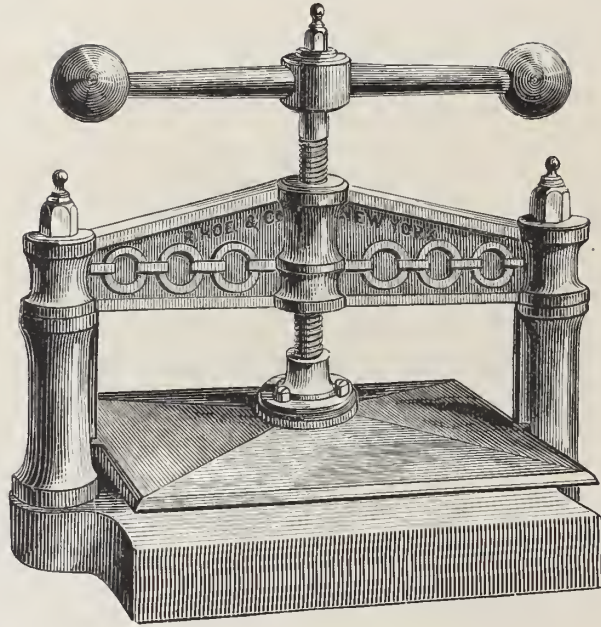


TREASURY PATTERN.

No.	Size of platen.		Price.	Boxing.
3	11 × 16 inches	. . . . .	\$20.00	\$.75

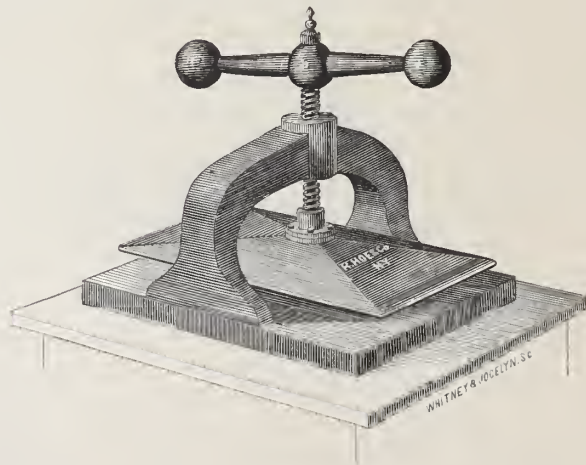
CAST IRON COPYING PRESSES.

These presses are of cast iron, substantially made, handsomely japanned, and adapted to ordinary work.



CHAIN PATTERN.

No.	Size of platen.	Price.	Boxing.
3	11 × 16 inches	\$25.00	\$.75
4	12 × 18 inches	27.50	1.00



EXPORT PATTERN.

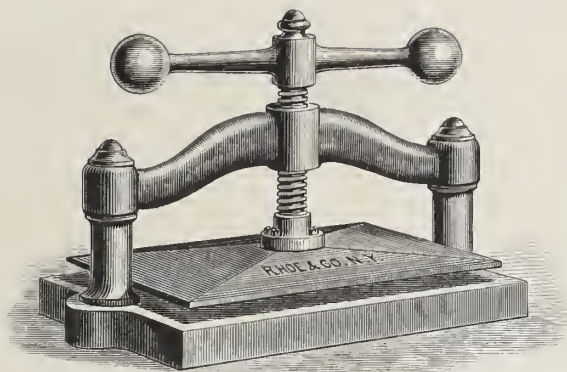
No.	Size of platen.	Price.	Boxing.
4	12 × 18 inches	\$24.00	\$1.00

CAST IRON COPYING PRESSES.

These presses are of cast iron, substantially made, handsomely japanned, and adapted to ordinary work.

No.	Size of platen.	Price.	Boxing.
1	9×12 in.	\$11.00	\$.50
2	10×13 in.	15.00	.60
3	11×16 in.	20.00	.75

This press is of cast iron, substantially made, handsomely japanned, and adapted to ordinary work.



CAST IRON COPYING PRESS, GERMAN PATTERN.

UPRIGHT PATTERN.

Size.	No. of Tablets.	Price.
Cap	3	\$20.00
Letter	3	15.00
Boxing, 50 cents.		

HORIZONTAL PATTERN.

Size.	No. of Tablets.	Price.
Cap	3	\$12.00
Letter	3	10.00
Boxing, 50 cents.		

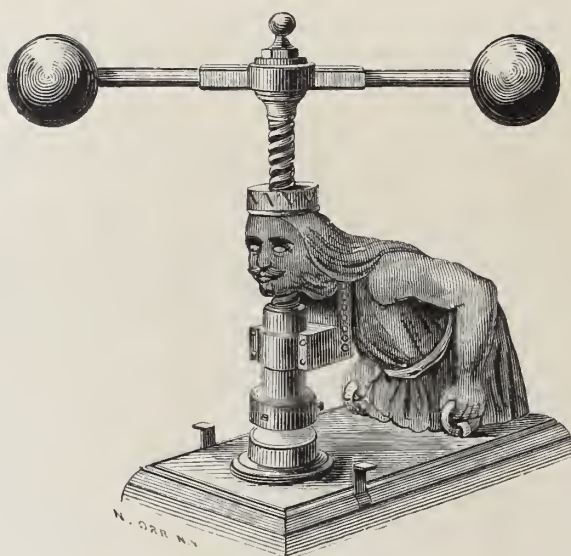
Extra tablets, letter or cap size, each, 20 cents. Enclosing in tin box, to keep wet, for shipment, \$1.



Upright Pattern.

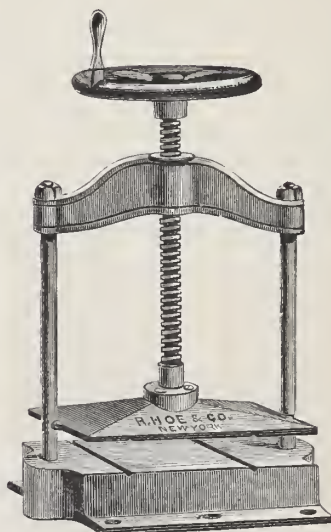
PATENT TABLET CASES AND DAMPENING TABLETS FOR COPYING.

These dampening tablets take the place of the brush, water cup, and blotting paper. Letters can be copied by their use with great dispatch, and three or four copies of the same letter can be taken at one operation. They will draw ink through the thickest writing paper, and may be advantageously used by the legal profession instead of handwriting in copying on thick paper.



SEAL PRESSES.

Name of pattern.	Size of die.	Space between centre of die and arch.	Price.	Boxing.
Notarial . . .	3 inches . . .	1 $\frac{5}{8}$ inches . . .	\$12.50 . . .	\$.50
Spring . . .	3 $\frac{1}{4}$ inches . . .	2 $\frac{1}{4}$ inches . . .	35.00 . . .	.75
Face . . .	3 $\frac{1}{4}$ inches . . .	4 inches . . .	50.00 . . .	2.00
Inca . . .	4 $\frac{1}{4}$ inches . . .	9 inches . . .	100.00 . . .	4.00



Bank Note Press.

BANK NOTE PRESS.

It has grooves for cords in the bed and follower, so that the notes may be tied up in the press.

The columns and yoke are wrought iron.

Size of platen.	Price.	Boxing.
3 $\frac{1}{2}$ × 9 $\frac{1}{2}$ in. . .	\$15.00 . . .	\$.75

SEAL AND NOTARIAL PRESSES.



Iron Frame Pattern.

IRON FRAME
PATTERN.

Table for Presses Nos.	Price.	Boxing.
1, 2, & 3	\$10.00	\$1.25
4 & 5	12.50	1.50
6	15.00	1.75

CABINET PAT-
TERN.

Table for Presses Nos.	Price.	Boxing.
1, 2, & 3	\$20.00	\$1.50
4 & 5	25.00	2.00
6	30.00	2.50



Cabinet Pattern.

BLACK WALNUT COPY PRESS TABLES AND STANDS.



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